MASTER OF PHILOSOPHY

A cross-sectional survey of health and health behaviours of individuals attending a Seventh-day Adventist Church in Coventry

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Award date:
2018

Awarding institution:
Coventry University

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MPhil

September 2018

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A thesis submitted in partial fulfilment of the University's requirements for the Master of Philosophy

Certificate of Ethical Approval

Applicant:

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Project Title:

An exploration of health needs and a church based intervention within a local Seventh-day Adventist Church in Coventry.

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk

Date of approval:

01 August 2016

Project Reference Number:

P45032

Acknowledgements

I firstly thank God who has given me the inspiration and motivation to persevere with the completion of this research.

I would like to acknowledge the knowledge and guidance and support of my Director of Studies, Dr. Lycett who has strongly supported me in the completion of this thesis. This wouldn't have been possible without her.

Thanks and appreciation also go to my supervisory team which included Prof. Michael Duncan and Dr. Anne Couffopolous who have supported me all the way through with their expertise and feedback on this piece.

Acknowledgements are also due to the Coventry Central Seventh-day Adventist church that so willingly allowed me to conduct this research on the members that attend this congregation.

Thanks to all my family and friends who provided the needful encouragement while undertaking this research project.

Abstract

Introduction

Seventh-day Adventists (SDAs) are a religious group in which extensive research has been conducted on the American population of SDAs which express the benefits of a vegetarian diet. Many of the SDA community in the United States of America (USA) look to the church for their teaching on health. SDAs teach, support and preach directly about specific health interventions and principles, many of which mirror mainstream health promotion messages, but with a different rationale. However, there is a lack of published studies on the health of this population group in the United Kingdom (UK). In addition to this, the SDA church within the UK is predominantly of black ethnicity. Within society black individuals are evidenced to experience an increased risk of chronic disease such as hypertension, type 2 diabetes and obesity. Additionally, Coventry is a 'Marmot' city, with high-levels of health inequality and deprivation with Coventry reported to have worse health than the rest of England. This study sought to investigate the health and health behaviours of SDAs at the main church congregation in Coventry to assess whether the conditions prevalent in the black community were evident in this sample of predominantly black SDAs who also adhere to specific religious health teachings.

Aim- To undertake a cross-sectional study of the health and health behaviours of SDAs at the main church congregation in Coventry.

Methods

This study followed a cross-sectional study design. Forty-seven participants were recruited from the Coventry Central SDA Church using convenience sampling. A health needs survey used by the health ministries leaders in the SDA church was adapted to improve validity and was completed by each participant. Questions were asked on their lifestyle behaviours such as fruit and vegetable intake and exercise. Measures of body composition and blood pressure were taken. The results were presented descriptively, and regression analysis applied to investigate the associations between the where individuals first seek help in times of sickness, and their health status.

Results

The participants were mostly female (57%, n=29) aged 18 – 62 years. Most were of black ethnicity (92% n=46). Most of those surveyed were obese with waist circumferences that put them at severe risk of heart disease (78%) and most had blood pressure within the healthy range. Iron deficiency anaemia was the most common health condition and many take iron supplements. There were no current smokers or consumers of alcohol in this sample. Most participants were active and had 7-9 hours of sleep daily. A vegetarian diet was the most commonly followed special diet and the mean consumption of fruit and vegetables was 5 portions daily. When asked about the source that is sought most commonly for help with health, God was the highest-ranking. There was no association between where people seek help from first and their health behaviours or health status.

Conclusions

Obesity and iron deficiency anaemia were prevalent in this sample. The rates of obesity, but not of type 2 diabetes, smokers or alcohol consumers, exceeded that reported for the non-SDA black UK population. The reasons for this need investigating further and specifically tailored health promotion for this population group may be helpful.

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Introduction

This thesis details the findings of a cross-sectional survey on health conducted on members of the Coventry Central Seventh-day Adventist church (SDA). This is a local branch of a worldwide Christian denomination that is renowned for very strict diet and health practices with many opting to follow a vegetarian diet (Loma Linda University 2017). As a result, this religious group has been the subject of great interest, with extensive research been carried out to assess the impact this and other positive health behaviours have on diseases and conditions such as cardiovascular disease (Kwok *et al.* 2014), diabetes (Thygesen *et al.* 2012) and obesity (Tonstad *et al.* 2009). It has been evidenced that SDAs through their religious health practices are 'healthier' than those of the general population (McKenzie *et al.* 2014a). As a result of these faith teachings, a group of SDAs in Loma Linda in the USA have been highlighted to be one of the groups of people that live the longest in the world (Buettner 2004).

However, there is very little research on whether the SDA communities in the UK also benefit from improved health as a result of their religious teachings. Within Britain, the SDA church is very ethnically diverse with a large proportion of its members being of Black African or Caribbean origin or descent. Those from Black and Minority Ethnic Groups (BME) are recognised to be at increased risk of particular health conditions and have reduced access to health. It may be that the religious health teachings of SDAs serve to mitigate some of the inequalities to health otherwise seen in these BME groups, but we do not know whether SDA in the UK engage in the same health practices as those in the US. Coventry is an area of ethnic diversity, high deprivation and health inequality, where these religious health teachings and practices may have significant influence in this group of SDAs, and so has been chosen for the focus of this thesis.

Chapter 1- Background

1.1 The History of the Seventh-day Adventist Church

This thesis will be exploring the health habits and behaviours of Seventh-day Adventists (SDAs) attending a SDA church in Coventry. To provide some context on this religious group, their history, beliefs and views regarding health will be explored in the subsequent sections. The SDA church is a Protestant Christian denomination, formally organised as a church in the year 1863 in the United States of America (Seventh-day Adventist Church n.d.). The church primarily formed from a group of Christians who fully believed in an imminent coming of Jesus Christ and were eager to share this with the world (Seventh-day Adventist Church n.d.). This belief in the imminent return of Jesus derived from the study of the book of Daniel and Revelation in the bible by a Baptist man by the name of William Miller (Maxwell 1977). His studies led him to predict the date that Jesus would return to earth – in 1843 and later in 1844. Others who were also studying the bible and joined this movement (known as the Millerite Movement) included Joseph Bates, James White and Ellen White. When the time had passed, and Jesus had not yet returned, many of William Miller's companions lost faith and this left a small group who continued to study the bible who sincerely believed that the date was accurate based on their study of bible prophecy. This period is known by SDAs as 'The Great Disappointment' (Maxwell 1977). Through their study of the bible they came to understand that while the date was correct, the event they expected to happen was wrong and this solidified their faith in the bible. Ellen White, who was part of this group is believed by SDAs to have the 'Gift of Prophecy' and was able to share visions from God based upon many topics in the bible (Seventh-day Adventist Church 2018b). One of these topics was the understanding of the 'Sabbath' as the day for Christians to worship as recorded in the bible. The believer's acceptance of this caused their name to change to the SDA church formally in 1863 (Seventh-day Adventist Church 2018b).

The SDA church is now a global body with 20,008,779 baptised members in the year 2016 (Office of Archives, Statistics and Research 2018). Individuals can become members of the church by receiving spiritual instruction with a Pastor; one of the churches spiritual leaders. They then subsequently will decide whether they desire to accept Christ, believe in him and adhere to the teachings of the church. This decision is commemorated by a public declaration in a baptism ceremony where they are immersed into a pool of water and welcomed into the church (General Conference of Seventh-day Adventists 2015).

The church takes church membership very seriously and there is an expectation that members will adhere to the teachings of the church. If a church member consistently rebels against the teachings of the bible after church members have tried to lovingly win them back to God, their name may be removed from the records as an SDA church member (General Conference of Seventh-day Adventists 2015a).

As witnessed by the origins of this church, all their teachings are based upon the Bible- the Christian's Holy Book which they believe to be inspired by God Himself. The teachings of the church are summarised into 28 fundamental beliefs (General Conference of Seventh-day Adventists 2015b). These include the belief that Jesus (the son of God) died on the cross, resurrected and is coming back to this earth very soon to remove evil and suffering from this world. They believe that currently Jesus is in heaven and is waiting for everyone to know and accept the love that he has for them. In the meantime, he has provided guidelines for having a fulfilling life here on this earth that Christians will be obedient to because they love God. These guidelines include the observing of the Sabbath which is the seventh-day of the week and instructed by God to be kept as a rest day free from work and labour to be spent worshipping God. Another guideline includes the obedience to the laws regarding health and diet to have a long healthy life free from disease. They also believe that having a healthy body would lead to a healthy mind and allow their communication with God to be much better. The SDA teachings on health will be explored further throughout this section.

Within the global church there are various levels of the organisational structure to assist with the ministry, the dissemination of the gospel, sharing of resources and for the ownership of church property. The global church is led by the President and has leaders, who represent church members, for the various departments such as the: youth department, children's ministry department, world mission, education, humanitarian aid and the health ministries department. The world church is then split into various sub-divisions according to the geographical areas of the world. These are called divisions which are then further divided into countries and then the local churches which preside in individual cities (General Conference of Seventh-day Adventists 2018a).

The leader of the church Health Ministries department is responsible for providing the information and opportunities for the church members to become healthy in body, spirit and mind. The local leader is referred to as the 'Health Ministries leader'. They are given the tools to assist them in sharing the message of health with the members of their local community

through a variety of programs initiated by the church. This is done in a variety of ways from conducting health checks, cooking classes and health presentations (North England Conference of Seventh day Adventists Health Ministries Department (n.d.). Often the healthcare professionals within the church may be trained and encouraged to lead these programs as part of comprehensive health ministry (Seventh-day Adventist Church North American Division 2018). Examples of initiatives and resources used within the SDA church health ministries department include: NEWSTART, Creation Health, Celebrations, the Health Expo concept and CHIP (Trans-European Division of Seventh-day Adventists 2017). NEWSTART is an acronym based on the 8 main health teachings promoted by the church for holistic health. These stand for: Nutrition, Exercise, Water, Sunlight, Temperance, Air, Rest and Trust in Divine Power (NEWSTART n.d.). Creation Health (Creation Health n.d.) and Celebrations (General Conference Adventist Health Ministries n.d.) are similar to the NEWSTART concept and contain the same principles with some variations. Programmes using these acronyms will utilise the principles to provide an all-round health programme for the participant. An example of this is the health expo concept that provides a free health check to individuals and focuses on the different health principles (Health Education Resources n.d.). CHIP is an abbreviation for Complete Health Improvement Program is a lifestyle program designed to assist participants in making changes to their lifestyle to reduce risks of chronic disease (CHIP n.d.). It is a program based on scientific evidence and the success of the program has been published in over 33 scientific articles in peer reviewed journals (CHIP n.d.).

All health ministries department leaders are provided with the 'Health Ministries Handbook' which is a step-by step guide instructing the leaders how to be effective in this ministry (North American Division 2017). The handbook contains a health needs survey that leaders are encouraged to conduct with their church members to better understand the needs of church members and how the health ministries leader can provide programs to best meet those needs (North American Division 2017).

The health needs survey consists of three main sections (health practices, health interests and demographics). For health practices, questions are asked about consumption of alcohol and tobacco, amount of sleep, adherence to special diets and the amount of exercise done. The survey also asks participants to identify what health educational programs they would be interested in attending and assisting with. Lastly, demographic information is recorded such as age, gender, ethnicity, level of education, area of residence and number of children. Additional

questions are asked regarding the participant's membership with the SDA Church and whether they believed that their trust in God as a Christian contributes to their overall health.

The resources provided by the church are often not designed for use in research. Therefore, for the purposes of this study, I have added objective and validated measures. These measures are those that assess one's level of smoking, alcohol use, fruit and vegetable intake, and amount of physical activity. The questions that were originally in the questionnaire relating to diet did not allow for objective data to be collected on dietary quality. The Five-a-day Community Evaluation tool (FACET) which has been evaluated by the National Obesity Observatory (2010) was therefore added and this tool that enables the assessor to accurately rank intakes of fruit and vegetables, as a proxy to diet quality. However, this is limited by its uncertainty as to its effectiveness with ethnic minority groups. The FACET tool used for the estimation of portions of fruit and vegetables in its pilot was found to overestimate the number of portions that participants consumed. Therefore, as well as the total number of fruit and vegetable consumed, a corrected value was also used based on an equation that more accurately estimated the actual number of fruit and vegetables consumed (Sofres 2004). The equation used for the 'corrected fruit and veg' figure is as follows: 'Food diary = 1:91 + 0.421x (Total fruit and vegetable intake from FACET)' (Ashfield-Watt 2007). The corrected fruit and vegetables values were used in our results.

Regarding smoking tobacco, data on 'Pack Years' was collected as this is a stronger predictor for the onset of lung and heart disease compared to current smoking status (Guaraldi *et al.* 2015). 'This is calculated by multiplying the average number of packs of cigarettes smoked per day (intensity) by the number of years the person had smoked' (Guaraldi *et al.* 2015:3). This estimates the lifetime exposure to tobacco. Giovannucci *et al.* (1991) present a comparative study that assessed the validity of self-administered questionnaires for reporting alcohol consumption in comparison to detailed diet records. The findings showed that they both provided similar results therefore suggesting that self-administered questionnaires are useful tools (in epidemiological studies) to ascertain the alcohol intake of an individual, without the need for collecting a detailed dietary record.

Physical activity can be measured by the General Practice Physical Activity Questionnaire (GPPAQ) (Department of Health 2013). This tool is used by General Practitioners as a brief intervention tool to ascertain whether an individual is in need of further input regarding their activity levels. The first two questions were included in the survey which is sufficient to provide

results that can be coded into the following categories: inactive, moderately inactive, moderately active and active. In a validation study investigating the effectiveness of using the GPPAQ for assessing changes in moderate to vigorous and sedentary behaviour (Cleland *et al.* 2014), 345 participants were randomly selected using computer generated numbers and selected. 101 were potential participants after those were excluded due to their decline. They were asked to use an accelerometer for 7 days in which they then completed the GPPAQ survey. This was then completed again for some of the sample 3-6 months later. Analyses were then used on the data of 65 individuals (they had sufficient data from the accelerometer) to then assess the change statistically. The result was that the GPPAQ, while it had a correlation between the minutes of activity with the accelerometer, the range was much larger than the results collected with the accelerometer. It therefore is not recommended for the GPPAQ to be used to provide precise results for assessing the physical activity levels of an individual. This was in congruent with findings from (Ekelund *et al.* 2006) that found reasonable specificity for identifying physical activity categories, however displayed poor sensitivity when using the International Physical Activity questionnaire in Swedish adults. These observations are thought to be present due to the overestimation of the physical activity undertaken when individuals are asked to give self-reported data. Despite this, a limitation to comparing the GPPAQ to the use of the accelerometer was that it does not account for movement of the upper body such as cycling and swimming. The GPPAQ was therefore chosen as an estimate of activity levels within broad categories as more precise measures of physical activity were not required here. GPPAQ data was translated into a Physical Activity Index, stratified into the following categories: inactive, moderately inactive, moderately active and active based on their activity levels in their occupation and any additional exercise they took part in. This was done through input into the coded spreadsheet provided by Department of Health (2013).

Another area included within the survey was of a spiritual nature, relating to whether the individual believed that trust in God could lead to all round health. There is emerging evidence to say that belief in a higher power has positive effects on how individuals view an illness such as cancer (Ahmadi, Hussin and Mohammad 2018). There is also however sometimes a negative response to religion and God as a result of suffering through ill-health (Ahmadi, Hussin and Mohammad 2018).

A survey instrument was used to assess who African-American Christians seek for help in times of crisis (Hardy 2015). The findings were that they are more likely to seek religious help before seeking external help. One of the reasons provided for this is the fact that the church members

often fear what their religious leader such as the Pastor may think of them making such a decision as they are often seen as gatekeepers especially regarding areas of health. This survey was done with a range of Christian denominations and not exclusive to SDAs. It would be interesting to observe if there are any similarities in this phenomenon in this study's sample. Data collected from the National Survey of Black Americans shows that women are more likely than men to seek help from African American ministers when there is a serious emotional issue to the neglect of accessing healthcare services (Neighbors, Musick and Williams 1998). Reese *et al.* (1999) indicate that African Americans are more likely to distrust the health care system and thus less likely to use a hospice. Although these findings are not current and from the US, it suggests that Black individuals are more likely to refer to faith leaders or other sources rather than use the healthcare system. The results from this for this sample and the subsequent impact on health will be considered. The following sections explain why the health behaviours considered in the survey are important to SDAs.

1.2 What does the SDA Church believe about health?

In the same year as the inception of the organisation of the SDA church, Ellen White is believed to have received a vision regarding the health principles now upheld by the SDA church (Maxwell 1977). This vision came at a time when many of the founders and early faithful members of the church were very sick and dying from ill health in a period in history when the medical system was not as advanced as it is now. In these visions the following matters were pointed out. Ellen White was instructed that the eating of meat was the main reason for the decline in the human race and that alcoholic drinks, spices and rich desserts should be avoided. She was also warned against the use of tobacco and the consumption of tea and coffee. Snacking and overeating were shunned especially before bed time. The intake of drugs for the treatment of disease was discouraged and instead drinking plenty of water, having exercise in the fresh air, allowing sunshine and fresh air into the home and having baths once a day were suggested as alternatives for promoting good health. These principles presented to Ellen White in a vision has influenced the teachings that the SDA church uphold regarding health. On the SDA website for the Worldwide church of SDAs, these fundamental beliefs are detailed.

> 'Along with adequate exercise and rest, we are to adopt the most healthful diet possible and abstain from the unclean foods identified in the Scriptures. Since alcoholic beverages, tobacco, and the irresponsible use of drugs and narcotics are harmful to our bodies, we are to abstain from them as well.' (Seventh-day Adventist Church 2018a).

Further to this, general principles regarding health are often summarised as the eight laws of health which are described by Ellen White as: “Pure air, sunlight, abstemiousness, rest, exercise, proper diet, the use of water, trust in divine power—these are the true remedies. Every person should have a knowledge of nature's remedial agencies and how to apply them” (White 1938:301). These health principles have become an integral part of the SDA church over the years. This is to the extent that Loma Linda, California has been identified as a ‘Blue Zone’ where a high proportion of the population (who mostly are SDAs) live to the age of 100 years and above (Buettner 2004). Their health behaviours have been assessed to help identify the reasons behind their good quality of life. These have been highlighted as: eating nuts and beans, keeping the Sabbath and having a faith (Buettner 2004). Multiple other studies identify that aside from the fact that these principles originated from religious beliefs, there is documented scientific evidence to show the benefit of adhering to these principles. Examples of this will be discussed in the upcoming sections.

In an explanatory case study, Sabate *et al.* 2016 came to some conclusions of the importance of the message of health for the SDA church. Their findings were based on a perusal of writings believed to be inspired by God and other books by external authors on SDAs and health changes within society and Ellen G White. Sabate *et al.* states that a vegetarian diet was integral to the SDA faith as early as 1863, and in modern times, a vegetarian meal is what is provided at official church events. They conclude the dietary habits promoted by the church came at a time when health reform was needed in the United States. The purpose of the health message was to allow the SDAs of the current age to relate with the identity that SDAs had when the church was first instituted. SDAs believe that a good diet contributes to deeper spirituality. They also believe that by adopting the recommended diet of the church is a point of conversation with those who are not SDAs. Sharing their beliefs with others is one of the key beliefs and mission of the church. Therefore, adherence to the health message of the SDA church forms part of the identity of SDAs.

1.3 What does the SDA church teach about a healthy lifestyle?

The main areas of diet that are encouraged and promoted by the denomination are: a vegetarian diet, clean and unclean meats, and alcohol and caffeine intake (Fraser 2003). These are discussed in turn below.

1.3.1 Vegetarianism

It is documented that one of the main dietary principles that SDAs teaches and promote is that of a vegetarian or vegan diet which should be consumed as much as possible (Hardinge n.d.). As

described in the previous section, Ellen White (who is believed to be inspired of God) was instrumental in the development of the SDA beliefs on health. As a result, many of SDA health beliefs are based upon her writings and the information she believes God shared with her to disseminate to the SDA church. The following quotation highlights the origins of the belief that a vegetarian diet should be consumed.

> "In order to know what are most beneficial foods for humans, we must study God's original plan for man's diet. He who created man and who understands his needs appointed Adam his food. "Behold, "He said, "I have given you every herb yielding seed, and every tree, in which is the fruit of a tree yielding seed; to you it shall be for food." Upon leaving Eden to gain his livelihood by tilling the earth under the curse of sin, man received permission to eat also "the herb of the field." Grains, fruits, nuts, and vegetables constitute the diet chosen for us by our Creator (White 1905:295 – 296)."

This quote highlights that the original concept of a vegetarian diet originates from the Garden of Eden where SDAs believe humans were created. At this point SDAs believed that God instructed humans to eat the plants, fruits and seeds that God had created. This is the basis for the belief regarding a vegetarian diet however this diet is observed by SDAs to varying extents. Loma Linda University in California, conduct a rolling national cohort study which follows the health of 96,000 SDAs across the USA and Canada. In their latest report which provides data collected between 2001 and 2007, the proportions of SDAs that followed various types of diets were identified. The largest proportion of SDAs (48%) reported to be non-vegetarians and consumed red meat, poultry, fish, eggs and dairy more than once a week. Those who considered lacto-ovo vegetarian and consumed milk and eggs but no red meat, fish or poultry made up 28% of the sample. Ten percent of the sample reported being pesco-vegetarian and ate fish, milk and eggs but no red meat or poultry. The smallest percentage were those that were either semi vegetarian and vegan which eat red meat, fish and poultry less than once per week and no red meat, fish, poultry, dairy or eggs respectively (Loma Linda University 2017). These statistics show that despite the recommendation for adopting a vegetarian diet, the majority in fact choose to consume meat, poultry and fish. This is an interesting phenomenon that would need to be researched further to gain insights between the discrepancy in religious beliefs and actions of the church's members.

1.3.2 Avoidance of unclean meats

Another dietary principle observed by the SDA church is the avoidance of certain animals described as unclean meats. Davidson (2003), in a discourse discussing the diet of the individuals

in the various world religions, outlines that SDAs are one of the few denominations in Christianity that adhere to the principles of clean and unclean meats. This dietary principle is often seen as a rule of the Jews, however SDAs still believe it to be important today as it was a universal health principle for all. Whilst not all SDAs consume a vegetarian diet as evidenced above, there is a universal understanding held from the Bible that unclean meats should not be consumed (Seventh Day Adventist Church n.d.). The instructions for the animals that are to be consumed and those that should be avoided is listed in the bible. The criteria for animals listed as clean are: fish that have fins and scales, land animals that have split hooves and chew the cud and flying insects with legs above their feet such as grasshoppers and locusts (Zondervan 2000:137). Animals that are stated as unclean are those such as birds of prey and land animals that don't have split hooves and don't chew the cud (Zondervan 2000:137). In a historical account relating to health maters spoken of in the bible and evidence from archaeology, an observation is made that the animals identified as being clean fed on plant matter (Hendrix 1990). It is postulated by the author that avoidance of unclean animals is a method of preventing our contamination through the accumulation of toxins as they move up the food chain (Hendrix 1990). Regardless of any biological reasonings behind adherence to these principles, SDAs hold the principles of clean and unclean animals in high regard.

1.3.3 Avoidance of alcohol, tobacco and illicit drugs

In conjunction with the general view of healthful living and the belief that the body is the temple of God, SDAs are encouraged not to consume alcoholic beverages (along with other drugs and stimulants) because of the harmful effect it has on the human body (Seventh-day Adventist Church 1985). The current UK guidelines state that any increase in consumption of alcohol increases one's risk of cancer (Department of Health 2016). The recommendation is that men and women should drink no more than 14 units per week and pregnant women should abstain from drinking alcohol during their pregnancy. It is advised that this amount of alcohol should be drunk over the course of the week rather than being 'saved up' for 1-2 days of binge drinking. This is contrary to the teaching within the SDA church that promulgates that members should abstain from all that is harmful and have moderation in what is good therefore translating to abstinence from alcohol (Handysides and Landless n.d.). The Adventist Health Study (AHS-2), a research project that started in 2002 until the present day on the health of 96,000 SDAs in the US and Canada (Butler *et al.* 2008), shows that in the SDA samples studied, 7% report to be alcohol consumers (Loma Linda University 2017). This shows there is no complete abstinence from alcohol amongst the SDAs in this sample.

Tobacco is also discouraged by SDA teachings based on the fundamental principle of taking care of the body. It is recommended to avoid the intake of tobacco due to the affect it has on the mind and thus the impact on an individual to make wise choices (General Conference of the Seventh-day Adventist Church 2018b). The UK government also recognise the harms such as increased risk of hospitalisation, cancers, premature babies and diagnosis of a smoking related disease (Public Health England 2017d). Therefore, there is a huge drive and many initiatives by the health services to reduce the number of smokers nationwide in order to reduce the impact on health and healthcare services (Public Health England 2017d). The aims of the National Health Service therefore are congruent with the recommendations by the SDA church. In the sample of SDAs in the AHS-2, 1 % of the participants reported to be consumers of tobacco. The key points to be highlighted here is the fact that the recommendation by the government contrasts this teaching given by the SDA church regarding the consumption of alcohol. However, the views on smoking in society and within he SDA church are congruent. Generally, the beliefs derived from faith are widely accepted and followed in the USA sample of SDA, but not entirely. The reported consumption of alcohol and tobacco will be compared within the sample surveyed in this study.

In a study on SDAs in Ghana 87% were aware of the church's teachings on drug use and 98% were aware of the teachings on alcohol and tobacco. However, compared to the 90% choosing not to partake in illicit drugs, approximately 56% occasionally consumed alcohol and approximately 20% smoked cigarettes (Ganu 2013). This is higher than that reported in the USA Adventist Health studies, however self-report data is subject to social desirability bias and whether this is in fact a real difference between these cultures is not known.

1.3.4 Avoidance of caffeine

Another area of dietary consumption that is prohibited by SDA teachings is the consumption of caffeinated drinks and foods. This is based on the following statement by Ellen White:

> "Tea and coffee are stimulating. Their effects are similar to those of tobacco; but they affect in a lesser degree. Those who use these slow poisons, like the tobacco user, think they cannot live without them, because they feel so very bad when they do not have these idols....Those who indulge a perverted appetite, do it to the injury of health and intellect. They cannot appreciate the value of spiritual things. Their sensibilities are blunted, and sin does not appear very sinful, and truth is not regarded of greater value than earthly treasure"(White 1864: 128-129).

Caffeine, a constituent found in both tea and coffee are therefore discouraged due to their physical effects of stimulation that can impact mentally and spiritually. When the adults within

the Adventist Health Study on over 96,000 participants in the USA were surveyed it was reported that many avoid the intake of caffeinated beverages, however it is unclear what the adherence to these teachings are (Butler *et al.* 2008).

1.3.5 Rest and Exercise

The National Sleep Foundation recommend that adults should have between 7 and 9 hours of sleep each night (Hirshkowitz *et al.* 2015). Sleep, adequate rest and exercise are principles advocated by the SDA church through one of its founders, Ellen White (White 1938:301). This health principle is encouraged through observance of the seventh-day Sabbath, a full 24 hours each week where members are encouraged to rest from work and day to day activities to spend time in worship to God and resting with family and friends (Hardinge 2015). SDAs are also encouraged to get 7-8 hours sleep per night as per current scientific recommendations for optimal cognitive function and consequently improved spiritual health (Hardinge 2015). One of the factors that can greatly impact the quality of sleep gained is the amount of physical activity engaged in (Hardinge 2015). The SDA church are in agreement with the USA and UK government recommendations for the amount of exercise of two and a half hours of moderate intensity activity exercise to be engaged in weekly to reduce the development of type 2 diabetes, obesity and cardiovascular diseases as well as reduce the risk of developing osteoporosis (Hardinge 2015, U.S. Department of Health and Human Services 2017 and Public Health England 2016). There are limited studies from the AHS-2 participants that provide clear data on differing sleep and exercise patterns, however results were drawn from self-reported lifestyle markers such as dietary intake in black and white SDAs. Results showed the majority of black women slept less than 6 hours per day and the majority of black men sleep between 7 and 8 hours of sleep per day (Montgomery *et al.* 2007). The highest proportion of black and white males and females were engaged in high level activity (Montgomery *et al.* 2007). Black men were meeting the recommendations for sleep, and all are meeting the recommendations for exercise activity showing good adherence to these principles from this sample.

1.4 Religious motivation for health

Several studies suggest that religious motivation plays an important part in the health behaviour of SDAs. Dudley, Mutch and Cruise (1987) surveyed 801 young people aged 12-24 years in North America and found that commitment to God was the most common reason for those who abstained from tobacco, alcohol and all drugs. In a Ghanaian study on the relation of religiosity to the use of illicit drugs, it was found that 90% of the participants (who were all either baptised members of the church or regular and faithful attendees of the church service)

were so committed to God that it prevented them from taking illicit drugs which would harm their loyalty to God (Ganu 2013).

A cross-sectional study conducted in Canada contained a convenience sample of 509 black SDAs aged 18 years and over. A self-administered 92 item questionnaire assessing- diet, physical activity, water intake, exposure to sunlight, alcohol use, caffeine and tobacco use and rest was given out. Religious involvement was assessed using items from AHS-2 on religious practice. The independent variable was religious involvement while the dependent variables were: acceptance of church's health principles, participants' health status, and lifestyle practices. Demographic information such as: age, gender, education, ethnicity and church membership were collated. Once the results were analysed, compliance ranged from 10% engaging in adequate amounts of physical activity and 99% refraining from tobacco use. Lifestyle and religious involvement were positively associated ($p<0.05$) (McKenzie *et al.* 2014a).

In addition to this, another study conducted on Black SDA Canadians (McKenzie *et al.* 2014) found that private religious practice (the term this study used to describe: spending time in Bible study, praying, meditating, or just thinking about God) was protective against the initiation of regular smoking and the experimentation with smoking among adolescents. This study also found an independent positive association between private religious practice and acknowledgement of the perceived importance and especially acceptance, of health practices encouraged by the SDA church (McKenzie *et al.* 2014).

1.5 Evidence of health effects of the SDA lifestyle

Adherence to the SDA plant-based diet in the US population, has been associated with lower rates of chronic disease and all-cause mortality than the rest of the population (Kahleova, Levin and Barnard 2017). One key study is a prospective cohort study of 73,308 SDAs living in North America (Orlich *et al.* 2013). Participants were recruited from churches and data was collected using self-administered validated food frequency questionnaires. The researchers classified the participants into the following categories: vegan, semi vegetarian, lacto-ovo vegetarian, pesco-vegetarian, and non-vegetarians. They were followed up over a period of 5.79 years and the death data was collected from the National Death Index during that time, deaths were classified according to several categories such as ischaemic heart disease mortality and cancer deaths. The association between dietary type and death was investigated and results were standardised for age, race and sex to reduce bias from confounding factors. The study found that deaths resulting from cardiovascular, renal and endocrine conditions were significantly lower among those who consumed vegetarian diets compared to those who

consumed non-vegetarian diets. While there were many strengths of this study, especially relating to the large sample size and homogeneity of the study population (many vegetarians, sharing the same religious affiliation) the study was limited by its short follow up time such that a true result of the impact that diet has on mortality may not be witnessed.

The dietary content of the SDA vegetarians studied in the USA have been compared to the EPIC Study in Oxford (EPIC- Oxford n.d.). Within this study, they found a similar low saturated fat and high fibre intake when compared to British vegetarians. However, the SDAs in America were found to have a diet higher in vitamin C. It was observed that the rationale for a vegetarian diet for perceived health benefits may provide a significant contribution to the nutrient profile of an individual compared to the choice in diet based on environmental and ethical issues. The cohorts assessed in the UK were found to have a similar all-cause mortality before the age of 75 between vegetarians and non-vegetarians. However, it was noted that less individuals died from conditions such as pancreatic cancer and ischaemic heart disease when they consumed less meat (Appleby *et al.* 2016). A significant reduction in all-cause mortality was observed in those who changed their diets to a vegetarian diet during the study period. As explained earlier, it is argued that the differences in nutrient profiles between the groups of vegetarians was influenced by the motive of the participants in their choice of a vegetarian diet. In addition to this observation, the authors state that the characteristics of the USA sample, short follow up time and the components of the diets consumed may have contributed to the differences witnessed.

While the health and health behaviours of SDAs in the United States have been studied very few studies on SDAs in the UK have been conducted. One study of 312 individuals aged 25-79 years from 17 predominantly black SDA churches across London found that most (96.6%) of the participants believed that they were able to lower their blood pressure with their own efforts. 68.6% of those studied had an increased susceptibility for the onset of hypertension (Newell *et al.* 2009). This study is the only study that provides a glimpse into one area of health- hypertension and risk of developing hypertension in black SDAs in the UK.

1.6 Why study the SDA population in Coventry?

The importance of health to the SDA church has now been addressed, a summary of some of the main health teachings that pertain to this study, approximate adherence of a sample of SDA in the USA to these teachings and examples of studies conducted within the SDA population. The following sections will point to the fact that most of the SDA church in the UK, and Coventry where this study is based are of black ethnicity. This is important to note as those of black ethnicity are disproportionately impacted with health problems in the UK. These health issues

will be identified to provide background to the importance of surveying a predominately black group of SDAs in Coventry.

Within the UK, the SDA church (British Union Conference) is split into the North England Conference, South England Conference, Welsh Mission, Scottish Mission, and Irish Mission (Seventh-day Adventist Church n.d.). Different classifications compared to the UK census have been used to identify the various ethnicities of the membership, therefore the broad categories of: black, white, mixed, Asian, other and unknown have been used. The British Union Conference is 60% black, 7% white British, 6% white non-British, 2% white unknown, 3% Asian, 3% other and 19% unknown (British Union Conference of Seventh-day Adventists 2017). Within the North England Conference, the region where the church under study is a part of, contains 61.8% black, 13% white, 2.8% Asian, 0.5% mixed, 2.8% other and 19.4% unknown (British Union Conference of Seventh-day Adventists 2017). There are two churches in Coventry – Coventry Central and Henley Green, the former being the site for this research. This is the larger one, where 70% of the membership is black, 0.9% are Asian, 1.8% mixed, 12.6% white and 0.5% other and unknown 12.7% (British Union Conference of Seventh-day Adventists 2017).

1.6.1 Britain's Ethnic Minorities

The SDA church in Coventry is of majority black ethnicity. The church therefore has members that are disproportionately affected by particular health conditions. The health issues that affect this group of people within the UK will now be highlighted. Information from the latest census conducted in the UK show that the nation has increased in the number of individuals identifying as being from an ethnic minority (Office for National Statistics 2012). At the time of the 2011 census in the UK, it was recorded that the population was 86% white (Office for National Statistics 2012). The remainder of the population are represented by those classed as minority ethnic groups: Asian (including Chinese) 7%, Black African and Caribbean (3%), Mixed- 2% and Gypsy, Irish 'traveller' and other groups – 1% (Office of National Statistics 2012).

The term 'Black and Ethnic Minority' or 'BME' (Black and minority ethnic group) describes those who are non-white British living in the UK who are the ethnic groups in the minority. Those who are BME are those from: Irish, mixed/multiple ethnic group, Indian, Pakistani, Bangladeshi, Chinese, Black African, Black Caribbean, Arab and any other ethnicity (The Kings Fund 2006). For the purposes of this thesis, those who are referred to as 'black individuals' or of 'black ethnicity' are those that are of African and Caribbean descent and those that identify as Black British. Black African and Black Caribbean may also be terms used as sub-categories of

the term 'black ethnicity' to conform to the terms often used in research and reports in this area. 'BME' will also be referred to as the individuals who are of one of the minority ethnic groups in the UK as identified above.

Based on the 2011 census, London has the greatest proportion (3.286 billion) of ethnic minorities living within the UK with the West Midlands having the next largest concentration (968,178) (Office for National Statistics 2011). Coventry, one of the cities within the West Midlands, has a large BME community in this locality with higher percentages of white Irish, Mixed, Indian, Bangladeshi, Pakistani, Black African and Chinese than other areas of England (Coventry City Council 2015). In 2009, it was estimated that: 79.2% were White, 2.3% Mixed, 12.3% Asian, 3% Black, 1.5% Chinese and 1.5% other ethnicities (Office for National Statistics 2009). It is noted that there is a high prevalence of ethnic minority in the UK and Coventry. Coventry has a lower percentage (79.2%) of those who identify as being White compared to those of the general UK population (86%). This therefore shows that those who fall in the category of being an ethnic minority is greater in the City of Coventry.

1.6.2 Poorer overall health in Ethnic Minorities within the UK

There is literature supporting the thought that those of BME groups are more likely to suffer from ill-health in comparison to those of the indigenous population as highlighted by the Parliamentary Office of Science and Technology (2007). Some of these sources may be dated but provides useful insight into this area not often researched by the government. The evidence highlights that individuals of the ethnic minority groups have higher rates of Type 2 Diabetes and Obesity in comparison to those of White European descent (Public Health England 2014). It is also documented that those who consider themselves to be of an 'Ethnic Minority' are less likely to access healthcare services (The Kings Fund 2006). The next few sections will be highlighting the areas of health as it pertains to those of black individuals according to the national surveys conducted on health in the United Kingdom.

Those of black ethnicity are more likely than the general population to report low life satisfaction (Public Health England 2017c). In addition to this, those of Black Caribbean ethnicity are the 3rd highest ethnicity reporting their health rating as: 'fair', 'bad', or 'very bad' in the 2011 census (Office for National Statistics 2013a). Black African and Caribbean individuals are most likely to be deprived than those who are white British (Public Health England 2017c). Despite this, Black Africans are most likely to report very good health in comparison to all other ethnicities (Office for National Statistics 2013a). Overall this highlights a disparity between those of black ethnicity and those of white and other ethnic minorities in the quality of life that such individuals have.

Public Health England do not identify the reasons why this may be the case. However, perhaps targeted interventions for this group to address this may aid in removing the inequality in health and well-being and further research would be needed to identify why those who are black Caribbean rate their health differently from the black Africans. In my discussion of this research I compare the findings of the self-reported health rating in Coventry's SDA community to these.

In the health survey for England for the year 2014, a national health survey for the country, it was documented that black women have the greatest risk of developing type 2 diabetes in the UK (NHS Digital 2015). 27% of black women are at increased risk of developing type 2 diabetes and 60% are at increased risk of developing type 2 diabetes. This is in comparison to 32% and 25% respectively for White women (NHS Digital 2015). 83% of black men in the UK are at increased and high risk from developing type 2 diabetes compared to 67% of the general population (NHS Digital 2015). Body Mass Index (BMI) is an anthropometric measure used to classify obesity in adults (National Clinical Guideline Centre 2014). Anthropometry is related to the science of measuring the composition and size of the human body (Abernethy *et al.* 2005). There is insufficient evidence to determine any different BMI thresholds needed those who are Black Caribbean and Black Africans so thresholds for Europeans are also used for this population (National Institute for Health and Care Excellence 2013). Tillin *et al.* 2015, show that ethnic minorities (South Asians and African Caribbeans) have a greater prevalence of type 2 diabetes at a lower BMI and waist circumference measurement than Europeans. This was identified through their analysis of the results of a prospective study of 2533 Europeans, South Asian and African Caribbeans and their incidence of type 2 diabetes 19 years after baseline BMI measurements were taken. These results are in congruence with the recommendations given by the National Institute for Health and Care Excellence which suggest that practitioners should use lower BMI thresholds to prompt preventative measures for type 2 diabetes within ethnic minority groups such as the: South Asian, Chinese and African-Caribbean population groups. The suggestion is also made that public health professionals are aware of this and provide public health initiatives as part of the plan for preventing type 2 diabetes as these individuals are more likely to have type 2 diabetes at lower levels of BMI.

The Information Centre conducts a yearly 'Health Survey for England' which assess various factors of health of the individuals and the changes in the lifestyle habits of the nation. The report provides information risk factors for cardiovascular disease such as alcohol intake, blood pressure, diabetes, cholesterol, smoking and eating habits. The results are used in the development of policies within the healthcare sector in addition to the implementation of

services to tackle the problems highlighted. Each year there is a special focus for the report. In 2004, this was the last time that the health of ethnic minorities of the UK were assessed. Sproston and Mindell 2004 therefore provide the latest comprehensive data that document the health of ethnic minorities including black individuals. This therefore is the reason why this data is so relevant for this research despite it not being recent research. This resource will be used for data on obesity and hypertension.

Waist circumference can be measured additionally to identify abdominal adiposity (Health and Social Care Information Centre 2016). Between the years 2012 – 2014, black women (29.5kg/^{2}) had the highest mean BMI's in comparison to the general population (27kg/m^2) (NHS Digital 2015). Black men had a mean lower BMI (26.9 kg/m^2) than those of the general population (27.4kg/m^2). Black Caribbean and Black African women were more likely to have a raised waist to hip ratio and waist circumference in comparison to the general population, whilst Chinese men and women, and black Caribbean men had a lower risk of higher waist circumference values (Sproston and Mindell 2004).

Hypertension is defined by a systolic blood pressure greater than 140mmHg and a diastolic blood pressure greater than 90mmHg (National Institute for Health and Care Excellence 2016). The Health Survey for England measured three readings for the blood pressure of all its participants for an average reading to be supplied. After adjusting for age, the highest mean systolic blood pressure as per ethnic group was highest for black Caribbean men in comparison to men of the general population (Sproston and Mindell 2004). This report also displays that, Black African and Caribbean men and women are most likely to have hypertension in comparison to the general population (Sproston and Mindell 2004). These findings are consistent with the statistics on the prevalence of hypertension that highlights that those of Black African and Caribbean origins are more likely to develop hypertension (Public Health England 2017c). The cause for this is unknown and research has suggested that it may be related to genetics that cause there to be increased sodium absorption in the kidneys in black Africans compared to those of other ethnic groups (Spence and Rayner 2018).

Mortality caused by cardiovascular disease has more than halved since the year 2001. Despite this, in the year 2015, heart disease was the most common cause of death in males (Public Health England 2017a). In a systematic review on cardiovascular disease in Caribbean populations, strokes were more common in Caribbean populations (Francis *et al.* 2015). Hypertension is one of the major causes of strokes and therefore as blacks are at higher risk of

developing hypertension, this would explain this fact. Public Health England, an executive body of the National body within the government that seeks to improve the health and well-being of the country and reduce the health inequalities, commission a report on factors that impact health inequalities through the Public Health Outcomes Framework (PHOF). In 2017, the PHOF report focused on ethnicity. In this report it stated that: Caribbean and females born in Central and Western Africa had higher mortality rates from cancer in comparison to those born in England (Public Health England 2017c). Black women were most likely to be diagnosed with cancer at a later stage than White women (Public Health England 2017c). Those of Black ethnicity were more likely to be diagnosed with colorectal and lung cancer much later than those of other ethnicities (Public Health England 2017c). From this report it is not clear as to the reasons for this phenomenon, but it is important to note these statistics as it provides guidance that shows that those of black ethnicities experience inequality and that there are barriers to perhaps accessing healthcare facilities for diagnosis which may need to be explored.

In summary, the black community in the UK are more likely to: report poorer life satisfaction, have a greater risk of type 2 diabetes and having a stroke, have higher BMI's and mean systolic blood pressure and diagnosed with colorectal and lung cancer at a later stage in comparison to their white counterparts and those of other BME groups.

1.6.3 Lifestyle Behaviours of the Black Ethnicity within the UK

When considering physical activity, The World Health Organisation (WHO) states that adequate physical activity can reduce the risk of chronic disease such as: hypertension, cardiovascular disease some cancers, depression, and osteoporosis and prevent obesity (WHO 2017). It is recommended within the UK for adults aged 19-64 years to engage in 30 minutes of moderate intensity activity (exercise that raises the heart raises and causes sweat, 5 times per week (National Institute for Health and Care Excellence 2013). According to NHS digital, national information technology partner to the health and social care system, those of black ethnicity are more likely to be inactive compared to the White and Mixed groups (NHS Digital 2017).

Another area of lifestyle is one's dietary intake, an area of interest to those overseeing the health of the nation. The Health Survey for England 2004 report showed that the fruit and vegetable intake of men and women of Black ethnicity was comparable to the general population (Sproston and Mindell 2004). Those of Black African and Caribbean descent had lower levels of alcohol consumption and were more likely to be non-drinkers than the general population (Sporston and Mindell 2004).

Alcohol and smoking are two lifestyle habits reported on with regards to ethnicity. With respect to alcohol intake, in 2014, London was the region to have the highest levels of people reporting that they abstain from alcohol, closely followed by the West Midlands (Office for National Statistics 2014a). As London and the West Midlands are the areas of the highest ethnic diversity, it is postulated that this contributed also to these regions reporting this outcome (Office for National Statistics 2014a). Sixty-one percent of those who identified themselves as being White were more likely to report consuming alcohol in the previous week, compared to those of other ethnic minorities (Office for National Statistics 2014a). Sixty nine percent (69.3%) of Black African, Caribbean and other Black ethnicities are reported to have never smoked in comparison to 44.9% of White men and women of the general population (Office for National Statistics 2014b). Currently, 13% of Black ethnicities are cigarette smokers in comparison to 18.6% of the general White population.

1.6.3 Health inequalities in Coventry

The following section will now highlight the significance of Coventry being the place in which this group of SDAs are being surveyed. Coventry, the city in which this study is based had a population of 360, 100 individuals in the year 2017 (Coventry City Council 2018). Based on 2015 mid-year population data, Coventry is the 9th biggest city in England and the 11th biggest city in the UK (Coventry City Council 2016). Of the total population of Coventry, 33.4% are of Black and Minority ethnic groups; higher than the average for the UK (Coventry City Council 2018). The average life expectancy of residents living in Coventry is 82.4 years for females and 78.5 years for males. This is lower than the average life expectancy for both males and females in the UK (Coventry City Council 2018). The average age of all residents is 32 years old with 10% of the total population of Coventry having no qualifications (Coventry City Council 2018).

The overall health of those in Coventry is reported as being worse than the England average (Public Health England 2017b). Life expectancy for both men and women in Coventry is lower than the average for England (Public Health England 2017b). Deprivation is also an issue within Coventry; it is one of the areas that fall into the 20% most deprived of the country (Public Health England 2017b). Those who are more deprived are more likely to experience health inequalities (Public Health England 2017b). With regards to physical health and chronic conditions, those with type 2 diabetes exceed the average for the rest of England. The mortality rate for cancer and cardiovascular disease is significantly worse than the England average (Public Health England 2017b). Whilst 64.6% of adults in Coventry have excess weight which is lower than the

England average of (65.8%), the rate for children is much higher. 23.1% of children in Coventry are obese at year 6; 3.3% higher than the national average (Public Health England 2017b).

Coventry is reported to have a high level of deprivation when compared to other cities nationally. As a result, Coventry is one of the cities identified to be a target 'Marmot' City in a review initiated by the government when the Secretary of State asked Professor Michael Marmot in November 2008 to chair an independent review which would seek to find the most efficacious ways to reduce the health inequalities from 2010 onwards in England (Marmot 2010). This work involved identifying the health inequalities in England, compiling the evidence that would assist in reducing these inequalities when policies are implemented, suggest tangible and measurable strategies for implementing this and then writing a report to aid in the development of this important work in the government (Marmot 2010). The 6 key objectives developed from the review were the following:

1. Give every child the best start in life
2. Enable all children young people and adults to maximise their capabilities and have control over their lives
3. Create fair employment and good work for all
4. Ensure healthy standard of living for all
5. Create and develop healthy and sustainable places and communities
6. Strengthen the role and impact of ill health prevention (Marmot 2010:15)

'Marmot Cities' were subsequently selected as part of the strategy for the implantation of these objectives (Marmot 2010). Being a Marmot City provides the city of Coventry the opportunity to be a part of the 'Marmot Network' along with other areas in the UK who will receive support from the Marmot Team based at the University College London to speed up the city's action on reducing health inequalities in the area (Coventry City Council 2017).

The demographics and health status of the residents of Coventry have been highlighted to show the need for health promotion within the various population groups that are found in this city. There is insufficient data collected on Black individuals in Coventry specifically but there is sufficient evidence to imply this population might be at higher risk of ill-health. Being a local resident of this town, the SDA church has proven to be a convenient location for study, and therefore will be the focus of my research.

1.6.4 Places of faith for health interventions

As described previously, the SDA denomination across the UK is predominately (60%) made up of those of black ethnicity. The branch at Coventry is representative of the wider church organisation as it contains 70% individuals of black ethnicity. As a church that contains such a high proportion of this ethnic group, with a unique health teaching, it is uniquely placed to support the health of individuals that may be disproportionately affected by stroke, obesity, type 2 diabetes and hypertension. With the tightening constraints that the NHS has on its finances, opportunities are continually sought on how healthcare services can continue to be effective and meet the needs of those with the highest health inequalities. A systematic review of faith placed interventions to reduce obesity in African American communities has shown promise (Lancaster 2014). As a result, the use of places of worship and faith to carry out health interventions for their members and those of the community is emerging as a prospect promoted by local governments, and the World Health Organisation (Local Government Association 2017 and World Health Organisation 2009). Places of faith are said to be uniquely placed within their communities as places that have groups of people that may be considered hard to reach or may not engage as well with local healthcare services. Therefore, if health is promoted within these places of faith, healthcare can be provided for individuals who may not ordinarily seek help elsewhere. Another advantage of using places of worship for health interventions are since the members are generally very committed or dedicated to their higher power and helping humanity and thus it becomes easier to recruit volunteers to take part in running these initiatives (Local Government Association 2017).

1.7 Summary of Evidence

The SDA church is a relatively modern denomination originated in the USA in the year 1863. It started off with a small group of people who shared the same beliefs and now grown to be an established organisation of over 20 million members globally. They have teachings that members commit to following though the public declaration of baptism. Their teachings are derived from the bible from the visions they believe God inspired one of their founders Ellen White to receive. One of their main beliefs is regarding health and God's desire for them to have a healthy body and mind. These health teachings include: avoidance of unclean meats, following a vegetarian or vegan diet, and abstinence from smoking, alcohol and caffeine.

Within the churches' global organisation structure, there are various departments that leaders are given jurisdiction over to plan initiatives for that department and provide guidance to each region of the world. One of these departments is the Health Ministries department. A leader is

assigned to this department in every SDA church around the world. The leader of this department plans activities for health promotion for the members and community. Several structured health programs and initiatives are then led in churches. As part of the guidance received from the global leadership, a handbook is provided for all health ministries leaders. Within this handbook is a Health needs survey designed for distribution in churches to find out the health needs of the members. This survey includes questions on lifestyle habits such as number of hours of sleep, exercise, dietary intake and alcohol and tobacco consumption. Other questions also include self-reported rating of health, health conditions and medications. Spiritual questions were also asked regarding the individual's church membership and their belief in God to provide all round health and healing. For my research this survey has been adapted to include validated measures (such as FACET for fruit and vegetable intake, GPPAQ for exercise and anthropometric measurements) to provide more credible results for the foundation of this study.

An important piece of evidence highlighted about the SDA church in the UK is that it has a high number proportion of black ethnicity. Coventry was the focus of this study due to its high level of deprivation and being identified as a Marmot City by the government for targeted interventions to reduce health inequalities. Coventry is also one of the cities in the UK that has a great percentage who are of black ethnicity. The research shows that those of black ethnicity are more likely to have type 2 diabetes, hypertension and certain cancers and rate their health lower than their white counterparts The SDA church in the UK has high proportion of black ethnicity and this is reflected within the main SDA church in Coventry. Evidence is emerging to show that there is benefit in using places of faith or targeted health interventions for groups of people in society disproportionately affected by ill-health. The SDA church in Coventry is therefore uniquely placed to meet this need and be a way in which the needs of the members of this church who have an interest in health but may still struggle with the common conditions of this demographic.

1.7.1 Gap this research will address

Based on a perusal of the current literature on black individuals and SDAs in the United Kingdom, the aims and objectives of this research will address the gap consisting of lack in the number of research studies conducted in the UK on the health behaviours and outcomes of SDAs in the UK.

Aim: To undertake a cross-sectional study of the health and health behaviours of SDAs at the main church congregation in Coventry.

Objectives:

1. To describe the prevalence of obesity, self-reported hypertension and type 2 diabetes among black SDAs in Coventry.
2. To describe the health behaviours of this sample, specifically alcohol intake, smoking, fruit and vegetable intake, physical activity and levels of sleep.
3. To identify whether there an association between where individuals seek help from first in time of sickness and: BMI, waist circumference, systolic blood pressure, percentage body fat, and fruit and vegetable intake.

Chapter 2 – Method

2.1 Study Design

There are several quantitative methodologies that could be employed to explore the health habits and behaviours of SDAs. Longitudinal studies seek to measure a group of people over a set period with the aim of assessing any change in the characteristics of the group (Caruana *et al.* 2015) and the associations between these. It could answer the questions requiring long term follow-up e.g. is less disease development associated with following a vegetarian SDA diet compared with a carnivorous diet? If the aim of this research was to prove causality between e.g. does an SDA diet lower blood pressure? Then a randomised controlled study would be more appropriate. However, this research aims to answer questions related to prevalence of disease and health behaviours and explore an association between these and religious attitude to accessing health. Such questions are best answered with a cross sectional study design. Cross –sectional studies seek to observe the lifestyles, behaviours and health markers of a group of people which are representative of a population. Due to the data collection occurring at one point in time, cross-sectional design seeks to assess the prevalence of a specific condition or behaviour within a group of people; it doesn't however detect the incidence (Sedgwick 2014). There are many advantages to cross sectional studies, they are relatively quick, inexpensive and easy to perform (Setia 2016). Typically, a questionnaire or survey is used to collect the information. Cross-sectional studies can often be used to identify many risk factors for a population group. Cross-sectional studies are advantageous in aiding policy holders within public health to plan interventions in certain population groups based on the data collected. However, with this form of study, a few disadvantages exist; firstly, there can be the possibility of non-response bias which may occur particularly regarding surveys that are posted out to individuals. Non-response bias is what happens when the characteristics of those who are surveyed differ from those who don't respond thus resulting in a sample that is un-representative of the population group. Due to the nature of this type of study capturing a snapshot in time of the characteristics of a group doesn't reflect any disease states/health behaviours that may have been evident, at another time period nor can it suggest causality as it cannot show whether a disease has come before or after an exposure.

2.2 Setting

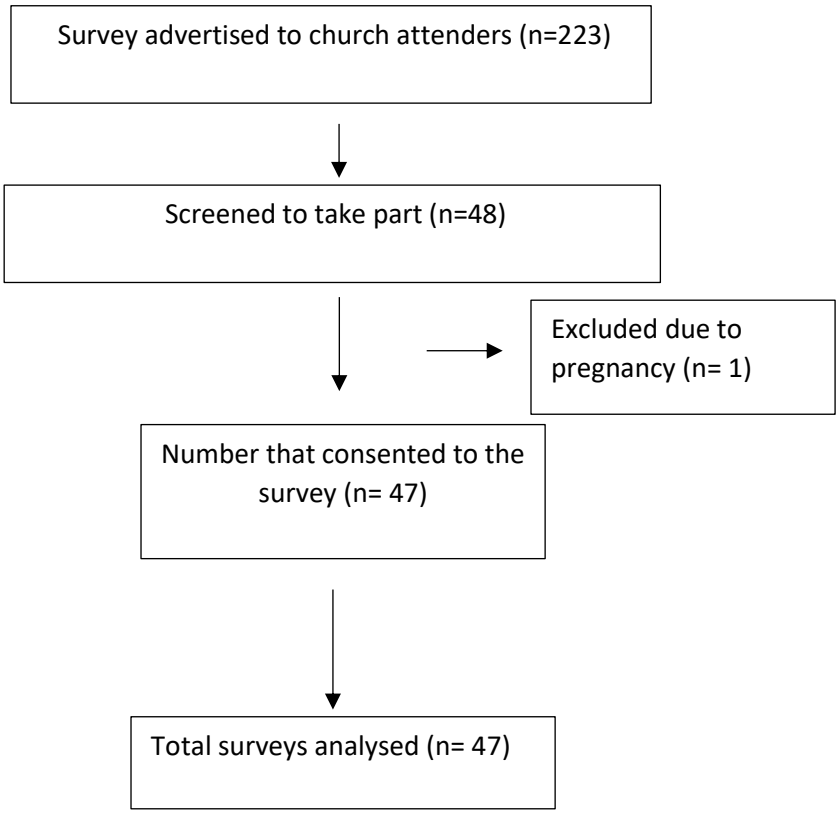
The setting for this study was the local SDA Church in Coventry, this was chosen for the reasons identified in the background that show that places of faith are being highlighted as favourable places to run interventions to meet the needs of the individuals in those communities. By

remaining in this setting, this should allow the participants to be comfortable in participating in the study. Permission was requested by the researcher from the Pastor of the church as the gatekeeper who would provide access to conduct research within the church (Appendix 2). Permission was granted by the Gatekeeper and church board committee to conduct this research (Appendix 3).

2.3 Recruitment

Forty-seven participants (Figure 1) were recruited by convenience sampling. The participants were recruited through a verbal announcement by the Health Ministries Leader in the main church service and a flyer (Appendix 4) placed on the church notice board. The aim was to survey as many individuals as possible within this one church. The population within this church is representative of the SDA church within the UK as highlighted in the background. The demographic information was collected during this study to confirm this.

Figure 1. Recruitment Flowchart



There are several ethical considerations to be highlighted regarding the recruitment process. A gatekeeper- the local church Pastor was approached for permission to have access to the population group for data collection. Gatekeepers are beneficial in that they firstly provide opportunities for researchers to gain access to population groups and they also assist in

ensuring that the research runs smoothly from the beginning to the end (Durham Community Research Team 2011). Based on the findings and the assessments made by Montgomery *et al.* (2007) describing the difficulty in recruiting black participants, it was advantageous for the researcher to be the health ministries leader within the selected church, which made it easier to access this population group to conduct this research. Black participants also respect when the researchers were culturally and theologically sensitive to the context of black SDAs and that all recruitment and promotion is tailored to them and the benefit to them highlighted (Herring *et al.* 2004).

However, proximity that the researcher may have had to the members being in a position of authority and sharing the same beliefs may provide some ethical concerns such as the risk of coercion. These concerns and how they were addressed will be discussed in chapter 4.

2.4 Participants

Participants were baptised members of the Seventh-day Adventist Church. Baptised members were identified during data collection through a self-reported declaration in the survey. Participants also had to be adults, 18 years of age and above, and able to read and write English, such that they could read and understand the participant information sheet and subsequently sign the consent form.

2.5 Data Collection

For the completion of the surveys, on the days of data collection, those who wanted to participate were invited into the youth hall of the church and sat at tables with chairs that already had a copy of the participant information form, consent form and survey. Once the participants had read the participant information sheet (Appendix 5) and asked any necessary questions, they returned their signed informed consent forms (Appendix 6) to the researcher. They were then given permission by me as the researcher to proceed with the health needs survey (Appendix 8). Participants were given the time to complete the form and then anthropometric measurements were taken and recorded.

Anthropometric measurements were taken by qualified nurses who were members of the church and had been asked by the health ministries leader to take the measurements. The researcher trained the nurses to take the measurements and use the equipment as per the research protocol (Appendix 9, 10, 11 and 12). Measurements were taken over self-reported data usually collected in the SDA Health Survey (North American Division 2017) for weight, height and waist circumference. Palta *et al.* (1982) documents findings that suggest that individuals when given the option to provided self-reported measures of weight and height, they

tend to under-report and over –report respectively. Additionally, percentage body fat, using bio-impedance scales, and blood pressure was measured by trained Nurses who were also members of the church.

The SDA Health Survey contained 28 questions, mainly written in closed question format with some open questions. Demographic questions on age, gender, age, number of children, area of residence were included. These provide descriptives of the population group which will enable us to have the particular characteristics of the population group being studied. They also provide categories in which to group characteristics together. As highlighted in the background, one of the major points that highlight the significance of research within this area is the access to healthcare of those from an ethnic minority group. As a result, it is necessary to collect this data in order to assess whether the observations regarding ethnicity is correct and thus whether the findings from this survey are consistent with current research surrounding the health of those within the African-Caribbean community. Education levels of the participants provide descriptive data of the participants which is useful for the reasons mentioned above. The knowledge of the number and ages of the dependents that the participants have helps us to identify whether these practices are affecting those of younger children also who may then go on to develop these health behaviours as they grow older. Particular areas/wards (such as St. Michaels and Foleshill) within the City of Coventry are known to have larger numbers of individuals from ethnic minority groups and also a disparity in their health outcomes in comparison to other parts (such as Bablake) of the city (Coventry City Council 2016).

One of the first questions asked in the survey was for the participant to select their perception of their own health (poor, fair, good, excellent) and to list any medical conditions they had and the medications they were taking. Two spiritual questions were asked, one regarding the individual's church membership and the other relating in their trust in God and His ability to provide all round healing. The participants were also asked to rank the sources in order of preference as to whom/what they would go to for help in times of sickness. The options provided were: church leaders, books/internet, God, friends and an option to write any other sources not mentioned.

While keeping as much to the structure and form of the SDA Health Survey, to maximise ease and receptiveness for the SDA community, the original survey was partially adapted to allow further exploration and additional validated questions to make the results more reliable. These validated questionnaires regarding dietary fruit and vegetable consumption (FACET) and

physical activity levels (GPPAQ) and tobacco consumption have been discussed in chapter 1. Four additional questions detailing the frequency and types of alcohol drank over the last 7 days to provide a snapshot of an individual's alcohol intake was also included.

As an alternative to asking whether the participant felt they got adequate sleep, the question was reworded to provide more objective rather than subjective responses. The ranges for the hours of sleep provided in the answer were adapted to take into account the current recommendations for hours of sleep in the United Kingdom which are 7-9 hours per night (National Sleep Foundation 2015). To gauge interest in health programmes, options were provided of possible health programmes that the church could provide. The participants then had to select which ones they would like to attend and/or assist in the leading out of them. The following question then required the participants to rank the programmes they were most interested in from 1-5. This information is useful as it provides points a direction of interest likely to be most engaging to the population for any future health related interventions.

2.6 Pilot Study

Eight participants volunteered to be a part of the pilot study to assess the amended survey for clarity. The participants were informed that their responses were not going to be included as part of data collection. Each person was given a survey along with a pen to complete it. All questions asked during this process were documented in order for changes to be made to the survey. One question was revised in this survey during this process. This was question 13 which used the FACET tool to itemise the number of portions of specific types of foods (mainly fruit and vegetables) consumed within the past 24 hours. The participants thought the instructions for answering this question was unclear. I therefore reworded the instructions by adding more detail and including an image that would help the participant in understanding portion sizes. I also ensured that during the data collection process that I verbally gave instructions regarding this question to further clarify how it should be filled out. Appendix 7 and 8 show the survey pre and post the pilot test. The amended survey was then used for data collection.

2.7 Data Analysis

SPPS statistical software (IBM 2016) was used to calculate the means and standard deviations of continuous data and percentage frequency of disease prevalence and associated risk factors. The differences in health variables according to where individuals go to for help first when sick, were displayed visually using box-plots and the significance of these differences was tested using linear regression analysis, following conducting the Kolmogorov-Smirnov test for normality. Where the dependent variable was also categorical, a chi squared test was conducted and

multinomial regression planned to adjust for confounding variables if a significant association was found.

To complete these regressions, dummy variables were created and the health services as the first point of contact was used as the reference category. Linear regression is used to identify a relationship between two or more continuous variables. This relationship is demonstrated by a slope which shows what happens to the dependent variable when there is a change in the independent variable (Campbell, Machin and Walters 2010). Multiple regression shows the relationship with multiple variables simultaneously so that confounding variables can be adjusted for when a significant association is found. As the p value for the regressions calculated indicated that the models were not statistically significant, the regressions were not adjusted for demographic factors such as age, gender and educational status therefore the unadjusted figures were used. An r^2 (also known as a percentage of variance figure or coefficient of determination) figure shows how well the dataset fits the predictive model. An r^2 value usually falls between 0 and 1 and a number closer to 1 shows that the model better fits the model compared to a value closer to 0 (Faraway 2016). Having this information is important as it assists the researcher in knowing how well a model can be used to predict what will happen to each variable within the equation when one is decreased or increased.

Chapter 3- Results

3.1 Participant Characteristics

Forty-seven participants were surveyed the majority (83%) of which are of black ethnicity educated to at least University level (Table 1).

Table 1. Participant Characteristics

Characteristics	**N**	**Mean (SD)**
Age: Mean (SD, range)	43	37.5 (15.1) (18-62)
		%*
Gender:	46	
Male	17	40.4
Female	29	57.4
Ethnicity:	46	
Black	45	91.5
White	1	2.1
Education Level:	45	
Did not complete high school	0	0
Completed High School	2	4.3
Attended College	3	6.4
Currently at University	16	31.3
Completed Undergraduate Degree	10	22.9
Completed Post-Graduate Degree	14	29.2

*Where % frequencies do not add up to 100%, this is due to missing data.

3.2 Health Data

The sample contained a high prevalence of overweight and obesity with 73.4 % (n= 33) of individuals being categorised as being overweight or obese. The waist circumference of individuals put the majority of the in the category for high risk of cardiovascular disease (78% and 81% of the sample for women and men respectively). 72% (n= 13) of the men and 56% (n= 14) of the women also had body fat percentages that exceeded that of the healthy body fat % range. 73.3% (n=33) of individuals were normotensive based on their systolic blood pressure (Table 2).

Table 2. Health Data

	N	Mean (SD)
BMI kg/m² (SD, range)	45	29.5(6.45) (19-47)
		%
Underweight (<18.5kg/m²)	0	0
Ideal Weight	12	26.7
Overweight	13	26.7
Very Overweight/Obese	20	46.7
	N	**Mean (SD)**
Waist Circumference (cm) (Male and Female) (SD, range)*	45	36.7(6.14) (27-53)
Waist Circumference (cm) (Women) (SD, range)	28	78.4 (12.3) (59.4 – 116.6)
		%
At no risk (<80cm)	6	22.2
At risk	0	0.0
At high risk	22	77.8
	N	**Mean (SD)**
Waist Circumference (cm) (Men) (SD, range)*	16	83.8 (12.3) (59.4 – 116.6)
		%
Not at risk (<90cm)	3	18.8
At risk	0	0.0
At high risk	13	81.3
	N	**Mean (SD)**
Body Fat % (Women) (SD, range)*	25	27.6 (12.2) (5.0 – 49.0)
		%
Low (20-39 Years) <21%	3	13.0
Low (40-59 Years)	2	8.7
Low (60-79 Years)	0	0.0
Healthy (20-39 Years)	5	21.7
Healthy (40-59 Years)	0	0.0
Healthy (60-79 Years)	0	0.0
Increased (20-39 Years)	1	4.3
Increased (40-59 Years)	2	8.7
Increased (60-79 Years)	1	4.3
High (20-39 Years)	3	13.0
High (40-59 Years)	7	26.1
High (60-79 Years)	0	0.0
	N	**Mean (SD)**
Body Fat % (Men) (SD, range)*	16	35.7 (10.7) (10-50)
		%
Low (20-39 Years) <8%	0	5.6
Low (40-59 Years)	2	11.1
Low (60-79 Years)	0	0.0
Healthy (20-39 Years)	1	5.6
Healthy (40-59 Years)	0	0.0
Healthy (60-79 Years)	0	0.0
Increased (20-39 Years)	0	0.0
Increased (40-59 Years)	2	11.1
Increased (60-79 Years)	0	0.0
High (20-39 Years)	5	27.8
High (40-59 Years)	4	22.2
High (60-79 Years)	2	11.1
	N	**Mean (SD)**
Systolic Blood Pressure (mmHg) (SD, range)	45	129 (18.4) (101-174)
		%
Normal Blood Pressure (<140)	33	73.3
Stage 1 Hypertension	10	22.2
Stage 2 Hypertension	2	4.4
Severe Hypertension	0	0.0
	N	**Mean (SD)**
Diastolic Blood Pressure (mmHg) (SD, range)	45	75 (10.6) (56-97)
		%
Normal Blood Pressure (<90)	41	91.1
Stage 1 Hypertension	4	8.9
Stage 2 Hypertension	0	0.0
Severe Hypertension	0	0.0

*Waist circumference and Body fat % are presented for male and female separately due to the varying cut off points for what is considered to place each gender at high risk of type 2 diabetes, cancer and heart disease. Waist

circumference ranges were collated by those recommended by British Heart Foundation (2011). These are the latest guidelines used for estimating risk of heart disease and type 2 diabetes due to abdominal adiposity. Blood pressure values for stages of hypertension were based on the guidelines by the National Institute for Health and Care Excellence (2016). Body fat % percentages of the participants were compared to the ranges recommended by the latest research on the ranges for percentage body fat (Gallagher *et al.* 2000).

3.3 Lifestyle Behaviours

Of the questions relating to lifestyle behaviours, the results showed that there were 0 current smokers and consumers of alcohol in this sample. The most common diet was a vegetarian diet consumed by 21% (n=10) of the total sample (Table 3).

Table 3. Lifestyle Behaviours

Tobacco Consumption		
		Mean (SD)
Mean number of years smoking		36 (13.4)
	N= 47	**%***
Never Smoked	43	92.0
Smoker	0	0.0
Ex-smoker	2	4.2
Alcohol Consumption		
	N=47	**%***
Drinker	0	0.0
Non-Drinker	46	97.9
Hours of Sleep		
	N=40	**%**
Over 9 Hours	0	0.0
7-9 Hours	24	60.9
Less than 7 Hours	16	39.1
Special Diet		
	N=16	**%**
Diabetic	1	4.2
Reduced Calorie	1	4.2
Vegetarian	10	20.8
Vegan	3	6.3
Low Fat/Low cholesterol	0	2.1
More Fruit and Vegetables	1	6.3
Other	0	2.1
Portions of Fruit and Vegetables		
	N= 46	**(Mean, SD)**
Portions of Fruit and Vegetables (corrected values for F+V) (Mean, SD, range		4.8 (1.5) (2.3 – 9.0)
Physical Activity		
	N=47	**%**
Inactive	0	0.0
Moderately Inactive	7	14.9
Moderately Active	14	29.8
Active	26	55.3

*Where % do not total 100% this is due to missing data.

3.4 Health Conditions and State of Health

The most common health condition reported by the participants of this study was iron deficiency anaemia (19%, n=7) and the most common medications taken were iron supplements (8%, n= 3) (Table 4).

Table 4. Health Conditions and State of Health

Self-Reported Rating of Health	**% Frequency (N)**
Excellent	6.4 (3)
Good	61.7 (29)
Fair	25.5 (12)
Poor	6.4 (3)
Health Conditions	
Hypertension	8.3 (4)
Type 2 Diabetes	6.3 (3)
Asthma/Breathing Problems	8.3 (4)
Iron Deficiency Anaemia	18.8 (7)
Pain	2.1 (2)
Digestive Problems	0.0
Allergies	4.2 (3)
Other	10.4 (4)
Current Medications (% taking meds)	
Hypertension Medications	4.2 (2)
Type 2 Diabetes Medications	2.1 (2)
Asthma Medications	4.2 (1)
Iron Supplements	8.3 (3)
Painkillers	2.1 (1)
Anti-Histamines	2.1 (2)
Heart Medications	4.2 (1)
Other Medications	4.2 (2)
Willingness to improve health	
Yes	100
No	0.0

3.5 Preference in attending health programmes

Out of the 41 participants that responded to this question, based on the mean rankings of preference for health programmes, the top five Weight Loss, Nutrition, Stress and Women's Health Issues (Table 5)

Table 5. In order of preference, how likely are you to attend the following programmes?

Programmes	Mean Ranking (SD)
Fitness	1.3 (1.7)
Weight Loss	1.2 (1.7)
Nutrition	1.2 (1.3)
Stress	1.0 (1.6)
Women's Health Issues	1.0 (1.6)
Cancer Prevention	0.1 (1.6)
Mental Health	0.8 (1.5)
Coping with grief/loss	0.6 (1.6)
Chronic disease	0.5 (1.1)
Sexual Health	0.4 (1.2)
Addictive behaviours	0.3 (0.1)
Men's health	0.3 (1.1)
Infectious Diseases	0.1 (0.5)
Smoking cessation	0.0 (0.0)

3.6 Spiritual Questions

Of the forty-seven participants, all were baptised members of the SDA church, 79% (n=37) of which are members of Coventry Central (Table 6). For the remainder who were not members of Coventry Central, this meant that even though they had been baptised, this took place at another SDA church in the UK or world and therefore were not registered with this congregation in Coventry as a member. They all believed in God to provide all round health (Table 6).

Table 6. Spiritual Questions

	% Frequency (N)
Baptised Member of the SDA Church	100.0 (47)
Baptised Member of Coventry Central	78.7 (37)
Belief in God to provide all round health	100.0 (47)

3.7 Where church members seek help from for sickness

Church members report that in times of sickness, the particular sickness was unspecified, most people seek God first, but no-one approached their church leaders in the first instance (Table 7). When they were asked to rank these sources (Table 8) the results were similarly ordered.

Table 7. Where church members report that they seek help from first

Source of Help	Percentage Frequency (N)
God	71.0 (34)
The Health Services	12.5 (6)
Church Leaders	0.0 (0)
Books/internet	2.1 (1)
Friends	8.3 (4)

Table 8. Where church members report that they seek help from first

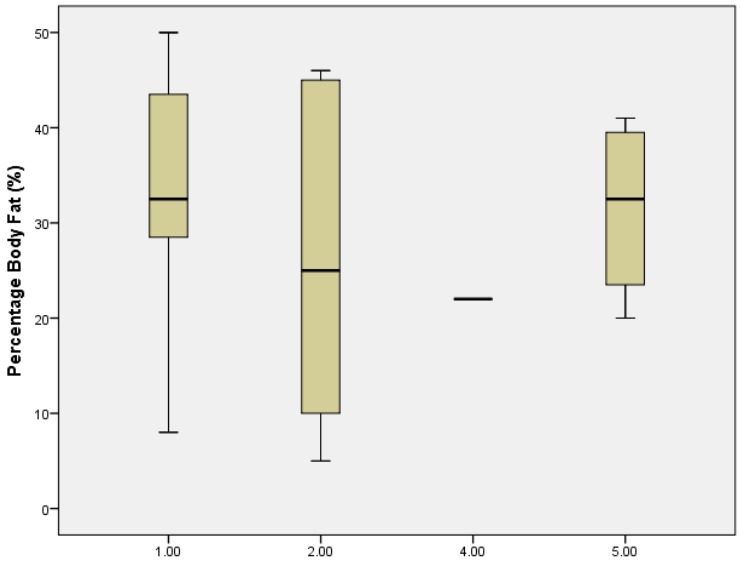
Source of Help	Mean Ranking (1 being most likely, 5 being least likely) (SD)
Church Leaders	3.9 (2.2)
Friends	3.0 (1.6)
Books/Internet	2.7 (1.5)
The Health Services	2.5 (1.2)
God	1.3 (0.9)

3.8 Differences between where individuals reported that they seek help from first and health variables

3.8.1 Descriptive Statistics

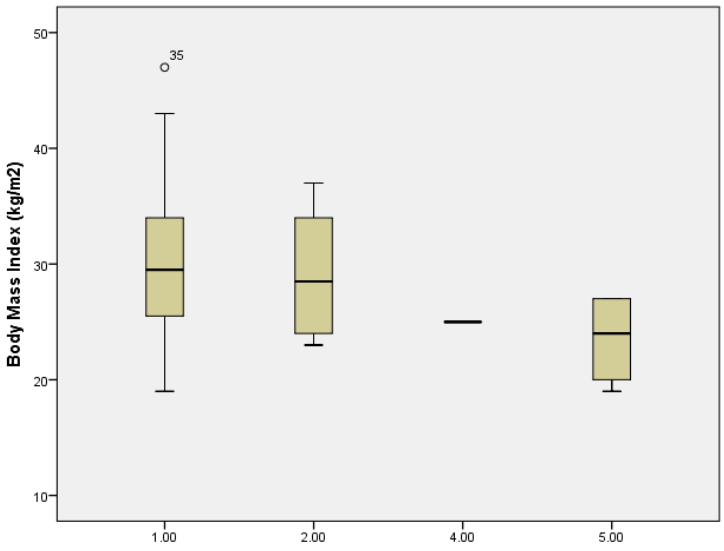
Those who reported that they sought the health services first had the lowest mean body fat % compared to higher medians for those who would seek God or friends first (Figure 2). The mean Body Mass Index was highest for those who would seek their help from God first and lowest who would seek friends first (Figure 3). Those who sought God first in times of sickness had the highest systolic blood pressures and those who sought friends first had the lowest systolic blood pressures (Figure 4). The highest consumers of fruit and vegetables are those who reported they sought help from their friends first in times of sickness (Figure 5). Figure 6 depicts that women who sought God first had a higher waist circumference than those who sought friends first. Men who reported they sought God first had a similar waist circumference when compared to those who reported they sought the health services first (Figure 7). Men that reported sought friends first when sick had the lowest waist circumferences (Figure 7).

Figure 2. Box Plot demonstrating the distribution of data in relation to the mean for % Body Fat and where participants sought help from first



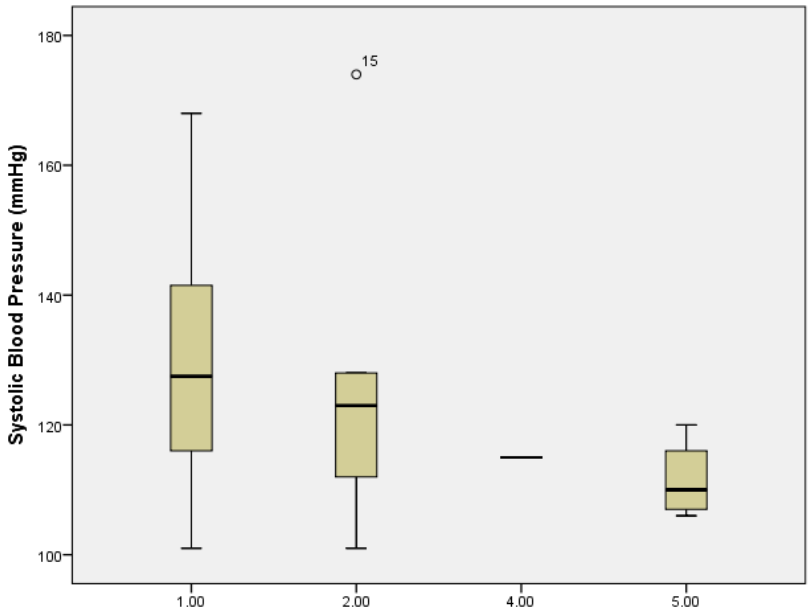
Key: 1 = God first, 2 = Health services first, 4= books and the internet first, 5= friends first, category 3 (church leaders first) was not represented by the data.

Figure 3. Box Plot demonstrating the distribution of data in relation to the mean for Body Mass Index and where participants sought help from first



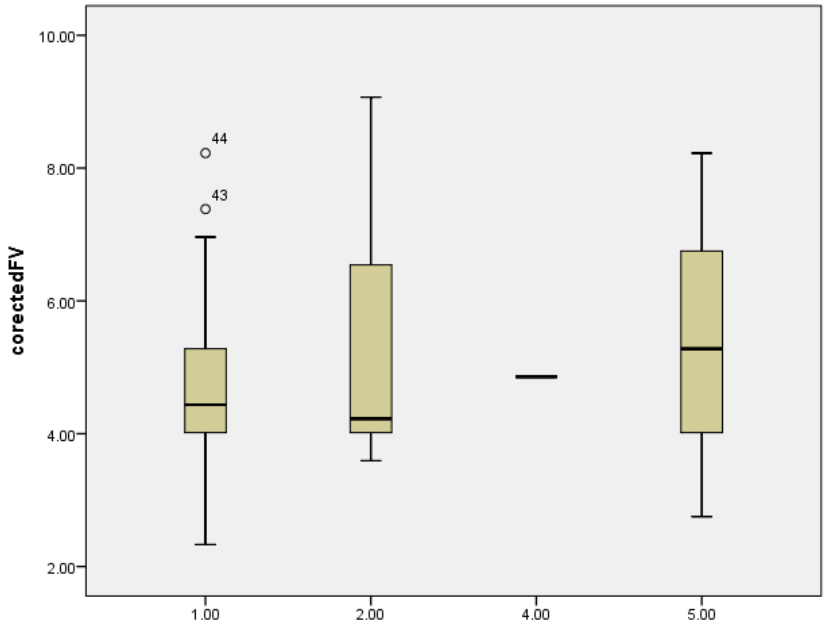
Key: 1 = God first, 2 = Health services first, 4= books and the internet first, 5= friends first, category 3 (church leaders first) was not represented by the data.

Figure 4. Box Plot demonstrating the distribution of data in relation to the mean for systolic blood pressure and where participants sought help from first



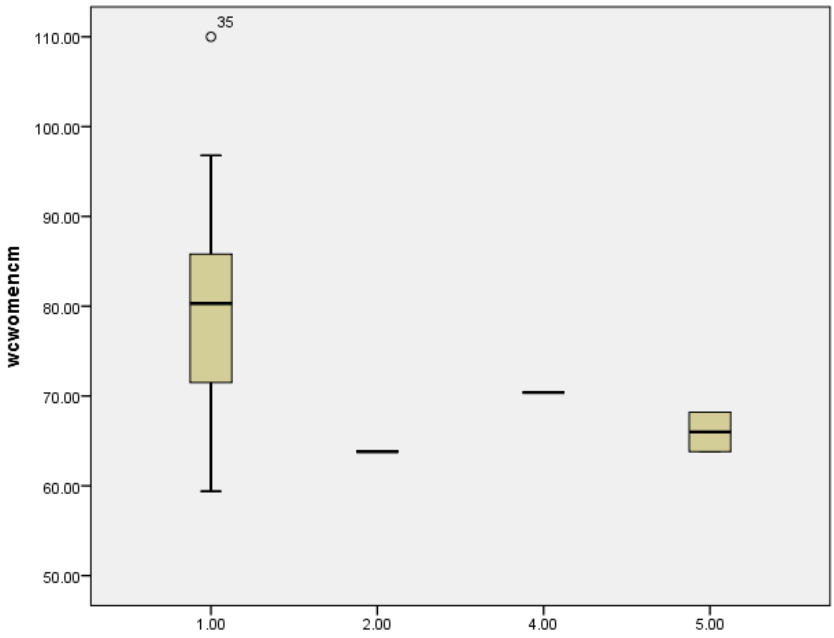
Key: 1 = God first, 2 = Health services first, 4= books and the internet first, 5= friends first, category 3 (church leaders first) was not represented by the data.

Figure 5. Box Plot demonstrating the distribution of data in relation to the mean for corrected fruit and vegetable and where participants sought help from first



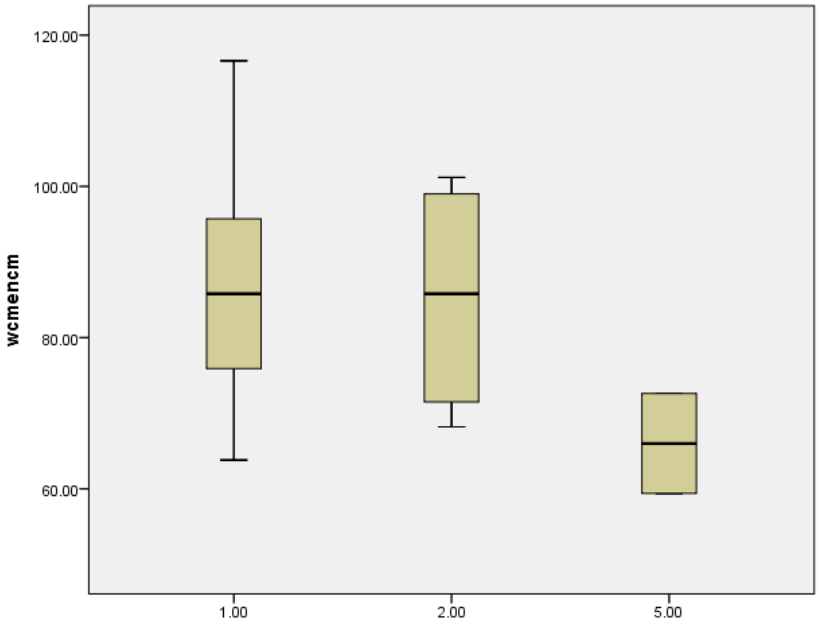
Key: 1 = God first, 2 = Health services first, 4= books and the internet first, 5= friends first, category 3 (church leaders first) was not represented by the data.

Figure 6. Box Plot demonstrating the distribution of data in relation to the mean for women's waist circumference and where participants sought help from first



Key: 1 = God first, 2 = Health services first, 4= books and the internet first, 5= friends first, category 3 (church leaders first) was not represented by the data.

Figure 7. Box Plot demonstrating the distribution of data in relation to the mean for men's waist circumference and where participants sought help from first



Key: 1 = God first, 2 = Health services first, 4= books and the internet first, 5= friends first, category 3 (church leaders first) was not represented by the data.

3.8 Tests for Normality of variables

Means and linear regression analysis is only suitable for variables that are normally distributed. Therefore, Kolmogorov-Smirnov tests for normality were conducted on the continuous variables such as: systolic blood pressure, waist circumference, body mass index and percentage body fat. These sets of data were normally distributed as highlighted in the graphs below (Figures 8, 9, 10 and 11).

Figure 8. Distribution of Systolic Blood Pressure Data

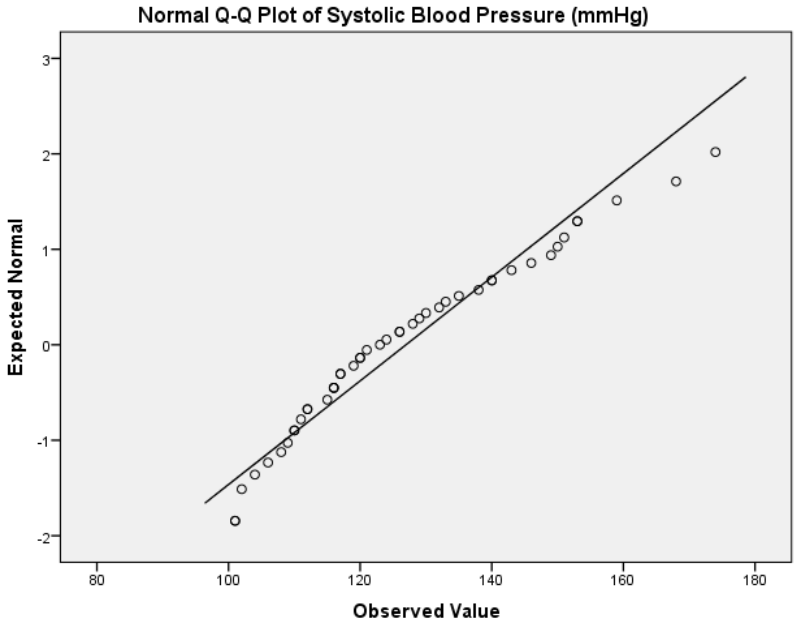


Table 9. Test of Significance for distribution of Systolic Blood Pressure data

	Kolmogorov-Smirnov[a]		
	Statistic	Df	Sig.
Systolic Blood Pressure (mmHg)	.116	45	.157

Figure 9. Distribution of Waist Circumference Data

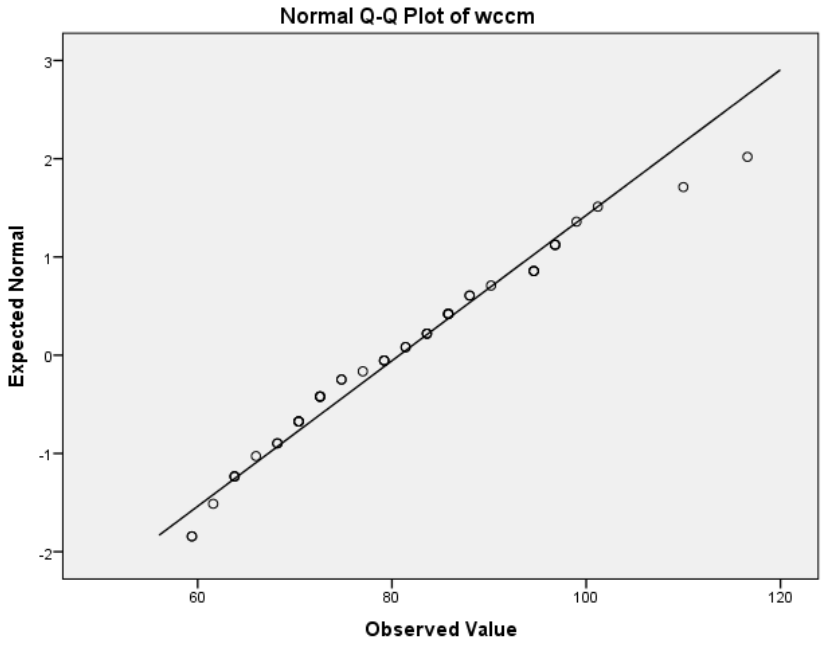


Table 10. Test of Significance for distribution of Waist Circumference data

	Kolmogorov-Smirnov[a]		
	Statistic	Df	Sig.
Wccm	.105	45	.200*

Figure 10. Distribution of Body Mass Index Data

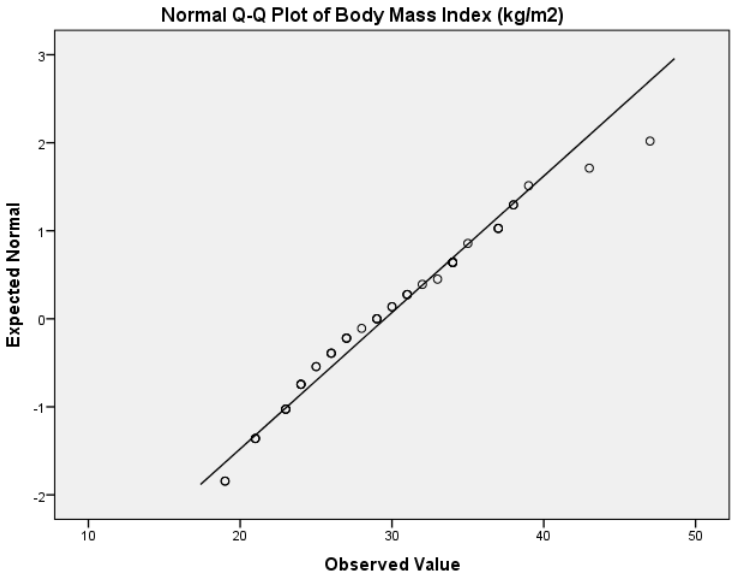


Table 11. Test of Significance for distribution of Body Mass Index data

	Kolmogorov-Smirnov[a]		
	Statistic	Df	Sig.
Body Mass Index (kg/m2)	.097	45	.200*

Figure 11. Distribution of Percentage Body Fat Data

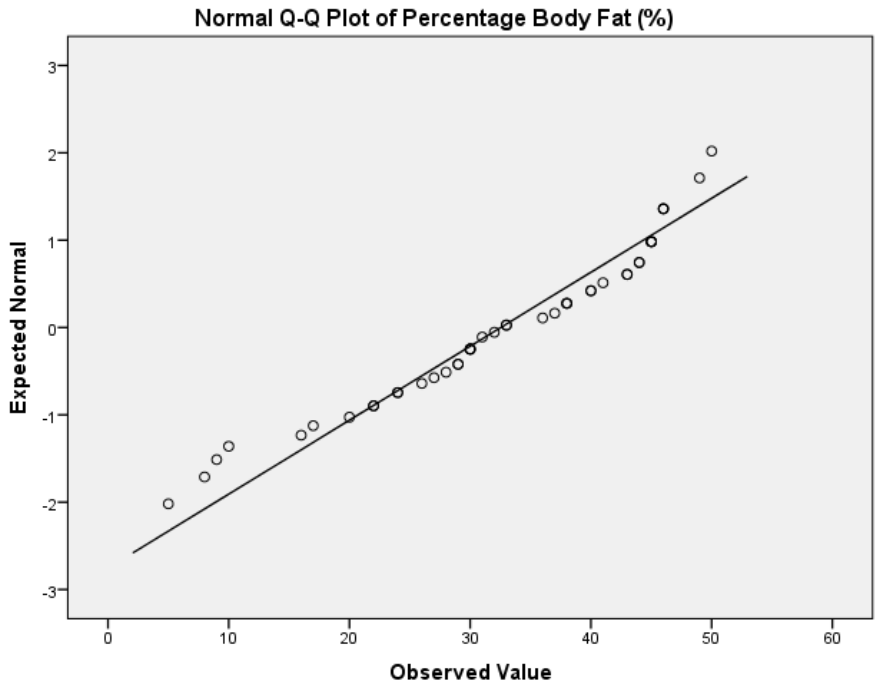


Table 12. Test of Significance for distribution of Percentage Body Fat data

	Kolmogorov-Smirnov[a]		
	Statistic	Df	Sig.
Percentage Body Fat (%)	.101	45	.200*

3.8.2. Regression Analyses

Linear regression was conducted to ascertain the association between where individuals report that they go to for help and BMI, waist circumference, systolic blood pressure, and % body fat. The r^2 values for this data set were too small suggesting that the data didn't fit the model well. The health services is not shown in the results table as it was used as the reference category.

Due to the fact that none of the participants reported that they would go to the church leaders first for help, there was consequently no data to be inputted therefore it was removed from the analysis. The results of the association between where individuals report that they seek help from and BMI show that those who reported they sought God first had a mean BMI 2kg/m^2 higher, those who reported that they sought books/internet first had a mean BMI 4kg/m^2 higher. Those who reported that they sought friends first a mean BMI 3kg/m^2 lower than if they reported that they sought the health services first (Table 14). The association was not significant (P >0.05), however the CI are wide indicating results are not precise, so we cannot be sure and a larger sample size is needed as if there was a true difference of 2 BMI units would be clinically important.

Table 14. Linear Regression Analysis- Association between where individuals seek help and BMI

Model $r^2 = 0.066$	**Regression Coefficients**	**95% Confidence Intervals**		**P value**
		Lower Bound	Upper Bound	
(Constant)	27.94			
God	2.36	-2.50	7.24	0.33
Books and internet	3.76	-6.04	13.56	0.44
Friends	-2.76	-9.82	4.29	0.43

The results showed that those who reported they sought God first could have an increased waist circumference of 5cm; those who reported they sought books/internet first had a mean waist circumference 6cm higher and those who reported they sought friends first a mean waist circumference 8cm lower than if they reported that they sought the health services first (Table 15). The association was not significant (P >0.05), however the CI are wide indicating results are not precise, so we cannot be sure and a larger sample size is needed as if there was a true difference of 5cm would be clinically important.

Table 15. Linear Regression Analysis- Source of Help on Waist Circumference

Model $r^2 = 0.091$	Regression Coefficients	95% Confidence Intervals		P value
		Lower Bound	Upper Bound	
(Constant)	77.53			
God	5.26	-4.78	86.63	0.30
Books and internet	6.41	-13.80	26.63	0.53
Friends	-8.14	-22.70	6.14	0.27

The results of the association between where individuals reported they seek help and systolic blood pressure show that those who reported they sought God and books/the internet first could have an increased systolic blood pressure of 10mmHg higher, and those who reported they sought friends first a mean systolic blood pressure 5mmHg lower than if they reported that they sought the health services first (Table 16). The association was not significant (P >0.05), however the CI are wide indicating results are not precise, so we cannot be sure and a larger sample size is needed as if there was a true difference of 10 mmHg would be clinically important.

Table 16. Linear Regression Analysis- Source of Help on Systolic Blood Pressure

Model $r^2 = 0.078$	Regression Coefficients	95% Confidence Intervals		P value
		Lower Bound	Upper Bound	
(Constant)	120.10			
God	9.47	-4.31	23.26	0.17
Books and internet	10.07	-17.69	37.83	0.47
Friends	-4.80	-24.80	15.19	0.63

The results of the association between where individuals seek help and % body fat show that those who reported they sought God first could have an increase of 6% on their body fat, those who reported they sought help from books/internet first had a mean % body fat 0.6 less and those who reported they sought friends first a mean 5% higher body fat percentage than if they reported they sought the health services first (Table 17). The association was not significant (P >0.05), however the CI are wide indicating results are not precise, so we cannot be sure and a larger sample size is needed as if there was a true difference of 6% would be clinically important. There was no significance in the impact of these variables on percentage body fat (P >0.05).

Table 17. Linear Regression Analysis- Source of Help on % Body Fat

Model $r^2 = 0.046$	Regression Coefficients	95% Confidence Intervals		P value
		Lower Bound	Upper Bound	
(Constant)	27.49			
God	6.14	-2.86	15.13	0.18
Books and internet	-0.66	-18.78	17.45	0.94
Friends	5.22	-7.82	18.27	0.42

Association between where individuals first seek help from and Physical Activity levels

The distribution of engaging with different levels of physical activity across the categories of where individuals first seek help from was compare using a chi squared test (Table 18). No association was found between these variables (p for chi squared = 0.74). Therefore, multi-nomial regression, to adjust for confounding factors was not justified.

Table 18. The comparison of where participants seek help from first and physical activity levels

		Physical Activity Categories				
		Inactive (n)	Moderately Inactive (n)	Moderately Active (n)	Active (n)	Total (n)
Source of Help	God (n)	4	6	12	12	34
	Health services (n)	0	2	3	1	6
	Books/internet (n)	0	0	1	0	1
	Friends (n)	0	2	1	1	4
	Total (n)	4	10	17	14	45

Chapter 4—Discussion

The black ethnic group is a minority ethnic group within the UK and Coventry, however it is a majority ethnic group within the Coventry Central SDA Church. The findings from this health survey conducted on the SDAs in Coventry were compared against comparable results from the 2004 Health Survey for England data sets for Black African and Black Caribbean individuals in the UK. The data from this survey is the latest comprehensive data collection of the health status of black Africans and Caribbeans in the UK, however ideally more recent results would be more accurate for comparisons with my study. This therefore needs to be considered when making the following comparisons. The rating of good health was around 20% greater in those within this sample in comparison to the overall black community of the UK. The participants from this study (46.7%) have a greater prevalence of obesity and therefore, more likely to have a BMI greater than 30kg/m^2. This is in comparison to 28.5% of black Africans and black Caribbeans in the general population who are obese. Despite this, waist circumference measurements were more raised in the black UK population than our sample.

The overall figure for those who self-reported to have type 2 diabetes from this sample was less (6.3%) than the general black population (8.3%). Iron deficiency anaemia was highlighted to be the most common condition reported by the participants in this sample. This number was greater (18.8%) than the individuals in the general black community (10.4%). The participants within this sample had a greater mean number of portions of fruit and vegetables (4.8 portions) in comparison to the figures for both black men and women in the general population (3.9 portions). It should be noted however that due to the evaluation of the FACET tool, there was found to be less reliability with the results for use in ethnic minority groups. All participants in this sample were non-drinkers compared to 28.5% of blacks in the general population. The participants also had a lower prevalence of cigarette smoking (0%) compared to 20% of black individuals in the general population.

Overall it is evident that when compared to the national statistics for individuals of the black ethnic group, there is a lower prevalence of: type 2 Diabetes, smoking and alcohol consumption within this SDA sample group. The SDAs within this sample on average have a lower waist circumference, consume a greater proportion of fruit and vegetables, and rate their health much better than their non-SDA counterparts. However, the SDAs in this sample have a greater mean BMI, systolic blood pressure and prevalence of iron deficiency anaemia than the general UK black population (Sproston and Mindell 2004). These results highlight areas of concern for the

SDA community around hypertension, obesity and iron deficiency. The principles followed by the SDA church promote good health behaviours such as abstaining from smoking and drinking which was adhered in this sample.

The findings of this study show some interesting and surprising insights to me as the researcher. Despite the strong health messages of being active and eating a healthy, predominantly vegetarian diet, advocated by the church, and the high education level of the participants, there were still many health concerns experienced by the church members which were higher than that which would be expected in the general population. The main health issues observed was that a large proportion of our sample were overweight and obese and had iron deficiency anaemia. Most of the participants reported that they were physically active and the average number of fruit and vegetables consumed were 5 per day, in keeping with government recommendations. It is unclear why with emphasis on health teaching in the church and reported adherence to this, my findings did not reflect this. It may be that greater BMI is associated with lower levels of smoking, something which has been investigated in other religious groups (Lycett 2015). It is possible that the participants did not answer the questions accurately, as much of the survey relied on self-report, and there may have been a tendency to overestimate healthy behaviours; as this is socially desirable. There may also be a discrepancy between the knowledge received and the implementation of that knowledge, as with other settings it is evident that education alone is rarely enough to change behaviour (Michie, Stralen and West 2011). In addition to this, although somewhat of a loose observation that showed no significant difference in the regressions (although this may have been due to the small sample size) those who reported that they sought God first in times of sickness had a higher BMI compared to those who reported that they would seek the health services first. Another consideration is the influence of the cultural mindset that exists in those of Black African origin; the concept of being overweight and its links to attractiveness. A qualitative study conducted on black South African women highlighted that some of the women liked being overweight as they felt they would receive less judgement from their peers and those in the community and that men would be more attracted to them (Draper, Davidowitz and Goedecke 2015). Women of a healthy BMI are often perceived as being sick with a disease such as Human Immunodeficiency Virus, tuberculosis or diabetes. Another qualitative study conducted on South African men and women found that those who were overweight or obese were more likely to view this as a sign of happiness and wealth (Okop *et al.* 2015). However, there was a counteracting view in the participants' mind where they also acknowledged that obesity had long term health implications

which were undesirable to them and they did not like how they looked being overweight. Perhaps this is the phenomenon witnessed here and there may be conflict between cultural perceptions of being overweight, knowledge of the church's health teachings, and knowledge of the health implications in being overweight. Interestingly, also despite the high prevalence of overweight, most were normotensive. This may have been because they were more active and ate plenty of fruit and vegetable but this could also have been due to the fact that this sample was relatively young. To find this out would require further investigation.

A high prevalence of iron deficiency anaemia is also another unexplained result from these findings. There are several causes of iron deficiency anaemia such as: reduced dietary iron intake, malabsorption, chronic blood loss and increased physiological need (Moll and Davis 2017). However, of all the special diets listed, vegetarianism was the one most commonly followed and this may be associated with iron deficiency in this sample. In a study comparing the nutritional status of 55 vegans and vegetarians with 36 omnivores, who acted as the control group (Śliwińska, Luty, Aleksandrowicz-Wrona, and Małgorzewicz 2017) serum ferritin, a protein responsible for the storage of iron and a reliable indicator of iron deficiency anaemia was lower in the vegetarian groups compared to the control group, although it did remain within the normal range. Equally, in 5 studies, a larger proportion of vegetarian females compared to omnivores had ferritin levels below the cutoff for deficiency (Powlak, Berger and Hines 2016). This shows that iron deficiency anaemia is more prevalent in vegetarians than non-vegetarians. It may be argued also that avoidance of certain meats and the encouragement of a vegetarian diet could also contribute to lower iron status in those who did not adhere to a fully vegetarian diet. In addition to this, from the assessment of blacks in the Health Survey for England, iron deficiency was found to be prevalent within those of this ethnicity. Although based on children, Lanzkowsky (2016) further emphasises this by stating that there is a higher prevalence of iron deficiency anaemia in African-American children in comparison to Caucasians. This raises the question as to whether the iron deficiency observed in this group is based on dietary intake, genetics or other biological reasons, the investigation of which lies outside the scope of this research study. With regards to the iron status of this population group, it is recommended there could be specific education on the pitfalls of an unbalanced vegetarian diet and information of good vegetarian sources of dietary iron to prevent an inadequate intake.

There are several strengths that can be attributed to this cross-sectional health survey of SDAs in Coventry. The most significant strength of this study is that it is a novel piece of research in this area. Based on the background of this area of research, there has been no other

comprehensive quantitative study in this area in the UK. Within this sample, a range of participants were surveyed, those of varying ages, educational status and both male and female. A variety of questions were also answered which gives a general view of the demographics of this group and the health needs they have. Although this sample makes up a very small part of SDAs in the UK it was demographically representative.

Another strength of this study was the inclusion of validated and objective measures for the data collection. This included the use of the FACET fruit and vegetable tool, the use of the GPPAQ questionnaire, and taking anthropometric measures during the data collection instead of self-reported values. These measures were able to provide some further credibility to the data collected. Although we included as many objective and validated measures as we could within the scope of this research further detail could have been included, for example, exact nutrient compositions of the participant's diet and intensity of physical activity conducted. Further insights could be gained in more comprehensive and objective measures of diet, physical activity and prevalence of type 2 diabetes (i.e. blood glucose readings).

The small sample size and the possibility for non-response bias are limitations as forty-seven participants were surveyed. However as this is the first of its kind within the UK, it provided a starting point in which the health needs of this group of individuals could be explored which can then be expanded on in the future. Ways in which recruitment could be improved, could be to conduct the recruitment over a several days to provide an opportunity for all who would like to attend to be able to do so. Churches are often very busy places and members may not always be present, therefore giving several options may have been more effective providing the time was available to do so. Additionally, another prominent member from the church could have been approached to assist me in speaking to them directly. A monetary incentive could have been used to encourage individuals to take part. The small sample size has also affected the analysis process and has impacted on the inability to gain meaningful results for the regression analysis which would provide useful information from the data collected. Non-response bias was also a possibility as the participants participated of their own accord. This therefore would mean that the characteristics of those who responded compared to those who did not may have been different and may have skewed the results (Sedgwick 2014). For example, those who were more health conscious and in fact healthier could have been the ones to respond therefore greater health needs, than were found here, may be present in this population.

When the participants were asked what source they would seek first in times of sickness, the particular sickness was not specified therefore making it difficult to clearly assess these results and compare to other studies in this area. In the future this question could be specified for clarity and describe whether sickness relates to the common cold or more chronic conditions such as cancer or type 2 diabetes.

The self-reported nature of the habits provide cause for questioning of some results such as the current smokers and drinkers of alcohol in this sample. This is especially significant as in other cohort studies conducted on SDAs there have been small numbers of participants who have reported being a current smoker or that they drink alcohol. There may be an element of guilt or shame if they were engaging in these activities but were fearful of sharing due to the perception of these behaviours within this community. This may have been particularly evident here as, as well as being a researcher, I was the health ministries leader within this congregation. My role in the church may have brought other limitations to the study particularly from an ethical point of view. My familiarity with the participants could have potentially led to coercion or unfair persuasion for the church to agree with taking part in the research. Therefore, at every stage I mentioned that participation was voluntary and there were no implications for not taking part. I also highlighted the benefits that producing this research would have in improving the health of this SDA community and others. I was very mindful to ensure that all the information provided to Coventry University ethics was also passed on to the church so that they are aware that the research was being conducted professionally and the church had the opportunity to provide written informed consent. The Pastor as the gatekeeper was also there to observe and ensure that the members were comfortable with the research and that I was doing things correctly.

Additionally, I was aware of my own bias, naturally as an SDA I wanted the findings to be positive and to portray the church in a positive light. Discussions with my supervisory team and peer review has helped me to interpret the findings objectively and the results were not as positive as I would have liked to have found a lower level of obesity that I did.

Ethically I also had the conflict as to the impact that sharing any negative findings from this study would have on the reputation of this church in Coventry in the wider local community and SDA church due to the reputation it has for upholding strong values on health. Interestingly, when I shared the findings with the church members although they were not all positive, they were very eager to learn how they could remedy this with future interventions.

However, there were also several strengths associated with my position in the church that enabled the research to take place. As a familiar and respected leader in the church, I was able to approach the church Pastor, who is the gatekeeper of the congregation, with confidence. Initial caution, they may have had, regarding my intentions as a researcher, were small. As the health ministries leader within this church, it is expected that programs would be conducted to improve the health of the congregation. This reduced any objection from the members in conducting the research as it was very much seen as part of my role, in particular as I was basing it on a survey they were familiar with. My familiarity to the members also made it much easier to recruit the registered nurses from the church to assist in taking the anthropometric measurements. The SDA church is a unique congregation and has particular nuances that an external person would not be aware of. These nuances include knowing the best times to promote the research within the church programmes as well as the most ideal times to conduct the data collection itself.

In some ways my involvement in this research resembled that of a participative research methodology where research is conducted with the local people in a community and the researcher may also be a member of the community being researched (Durham Community Research Team 2011). I had an interesting position as I was a member of the church but also had the perspective of the researcher and so therefore was able to appreciate the viewpoints of both sides and enable the research to take place sensitively. Such participatory research also builds the foundation participants to work together to develop solutions to address the health needs identified.

Obesity and iron deficiency anaemia were prevalent in this sample. The rates of obesity but not of type 2 diabetes, drinkers and smokers exceeded that reported for the non-SDA black UK population. Specifically tailored health promotion for this population group needs to be explored. There was no association found between where individuals sought help in times of sickness and the measurements (i.e. BMI, waist circumference and fruit and vegetable intake) but our results are limited by the small sample size. The most common self-reported health condition was iron deficiency anaemia and a vegetarian diet was the most common special diet adhered to. The association between these two factors in this population could be explored in further research. Promotion of vegetarian sources of dietary iron to reduce the prevalence of iron deficiency anaemia in this population group may be helpful. With regards to the iron status of this population group and also other similar groups, iron supplementation could be

considered as a preventative measure for those on a vegetarian diet and treatment option for those with iron deficiency.

It is unclear why obesity was so prevalent in this sample but cultural perceptions within the black community may have played a role. Focussed, culturally sensitive, education could be provided within the church setting around weight management to tackle this. Further research could be conducted to explore this at a deeper level and provide solutions for weight loss in this population group. A lifestyle intervention programme such as CHIP that is evidence-based but is also sensitive to the teachings of the SDA church perhaps would be beneficial in addressing the health concerns of this group. Tenets of CHIP that would be beneficial and of interest to the participants would be exercise, nutrition advice and help with weight loss. Based on the findings of this study, it may also be useful to ensure that the advice given takes into account any cultural stigmas and perceptions that may be held by women especially of the black community. Inclusion of information and advice regarding the prevention and treatment of iron deficiency anaemia would also be recommended for incorporation into a programme like CHIP.

This is a novel study to have been conducted in the SDA church in the UK. Recruiting from an under represented population and providing key baseline data on the physical activity, nutrition and lifestyle habits of this group can form a foundation for trialling future interventions to target this hard to reach population. This study could also inform future larger scale cohort or longitudinal studies to explore some of these lifestyle behaviours in more detail and the associations between them.

Dissemination of the results to health ministries leaders in the UK, through publication in SDA magazines and personally in various SDA churches around the UK would be prudent at this time. The purpose of this would be to raise awareness of the possible health concerns facing black SDAs in the UK and sharing strategies of how these can be overcome.

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Appendices

Appendix 1- Ethical Approval

Medium to High Risk Research Ethics Approval

Project Title

An exploration of health needs and a church based intervention within a local Seventh-day Adventist Church in Coventry.

Record of Approval

Principal Investigator

I request an ethics peer review and confirm that I have answered all relevant questions in this checklist honestly.	X
I confirm that I will carry out the project in the ways described in this checklist. I will immediately suspend research and request new ethical approval if the project subsequently changes the information I have given in this checklist.	X
I confirm that I, and all members of my research team (if any), have read and agreed to abide by the Code of Research Ethics issued by the relevant national learned society.	X
I confirm that I, and all members of my research team (if any), have read and agreed to abide by the University's Research Ethics, Governance and Integrity Framework.	X

Name: Chantal Tomlinson.....

Date: 21/06/2016.....

Student's Supervisor (if applicable)

I have read this checklist and confirm that it covers all the ethical issues raised by this project fully and frankly. I also confirm that these issues have been discussed with the student and will continue to be reviewed in the course of supervision.

Name: Deborah Lycett.....

Date: 13/07/2016.....

Reviewer (if applicable)

Date of approval by anonymous reviewer: 01/08/2016

Appendix 2 – Letter to Gatekeeper

Miss Chantal Tomlinson
Richard Crossman Building,
Coventry University,
Priory Street,
Coventry,
CV1 5FB

Pr. Lloyd Lambert
36 St. Nicholas Street,
Radford,
Coventry,
CV1 4BP

21st February 2016

Dear Pastor Lloyd Lambert,

I began undertaking a PhD at Coventry University exploring the assessment of religious and spiritual needs within dietetic weight management clinics. However having now seen a variety of opportunities for research in this field I am keen to steer my work to focus on the SDA community. I have had good feedback from presenting the research I did at undergraduate level, exploring the role of spirituality within dietary choices of Seventh Day Adventist students, at several academic conferences. I feel there is scope to develop this further in a way which will improve the health and well-being of the SDA community in the UK.

Our church in the UK and Coventry has a large percentage of Black African and Caribbean individuals. The literature is plenteous in stating that hard to reach communities such as those of Black and Minority Ethnic (BME) groups are more likely to suffer from ill-health in comparison to those of the indigenous population. This is highlighted by the Parliamentary Office of Science and Technology (2007). The evidence highlights that individuals of this ethnicity have higher rates of Type 2 Diabetes and Obesity (Public Health England 2014).
It is also documented that those who consider themselves to be of an 'Ethnic Minority' are less likely to access healthcare services (The Kings Fund 2006).

The Seventh-day Adventist church has unique health teaching but we don't know how much this is adhered to. I would therefore like to explore the perceived health needs of a local SDA community and investigate what health behaviours they have, with a view to evaluating the impact of a health intervention which has been run successfully in the US for this population.

I also believe personally that the Seventh-day Adventist church teaches a health message that is very effective in leading people to better health physically, mentally and spiritually. As the health ministries leader, together with my academic calling, I believe it is important to maximise this role to not only improve the health of the congregation but clearly demonstrate any benefit of our health ministry both to the church and also to those outside of the church who are looking in.
Developing research evidence for this shows that there is a need for involving spirituality within healthcare as part of 'whole-person care'. Evaluations are important because they help us to identify the health needs that individuals have based on their current health habits and practices. This is then beneficial in providing direction with regards to interventions to meet these needs.

I would therefore like to ask permission of the church to do a more formal evaluation of the health needs of our congregation and how these might be met.
This would involve the following stages:

1. Providing that your team and the church board are happy for me to go ahead with this, I would like to talk to the church about my vision in this area. A letter would be required from yourself as the Pastor to show the church gives me permission to do this. This will form part of the ethical approval that needs to be obtained from Coventry University before I can start.
2. I would then conduct a health needs survey based on the survey provided at the Health Ministries' leader training (please find this survey attached separately). A participant information sheet and consent form would be provided prior to the completion of the survey in order for the members to consent to their information to be collected confidentially and analysed anonymously in the documentation of my research.

Thank you very much for your willingness in allowing me to propose this idea. I look forward to hearing from you soon.

Yours Sincerely,

Chantal Tomlinson

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Appendix 3- Gatekeeper Permission Letter

COVENTRY CENTRAL CHURCH: 36 St Nicholas Street, Radford CV1 4BP
COVENTRY HENLEY GREEN CHURCH: United Reformed Church, Woodway Lane, CV2 2AP
NUNEATON CHURCH: Nuneaton United Reformed Church, 2 Chapel Street, off Coton Road, Nuneaton CV11 5QH

———————————————————————————————

20/05/2016

To Whom It May Concern:

RE:

This letter serves to notify that Miss Chantal Tomlinson has been granted permission by the Coventry Central Seventh-day Adventist Church Board on 15th May 2016 to conduct the health needs survey in conjunction with taking measures such as height, weight and blood pressure.

For any queries regarding this matter, please feel free to liaise with the Local Pastor, Lloyd Lambert whose contact details are given below.

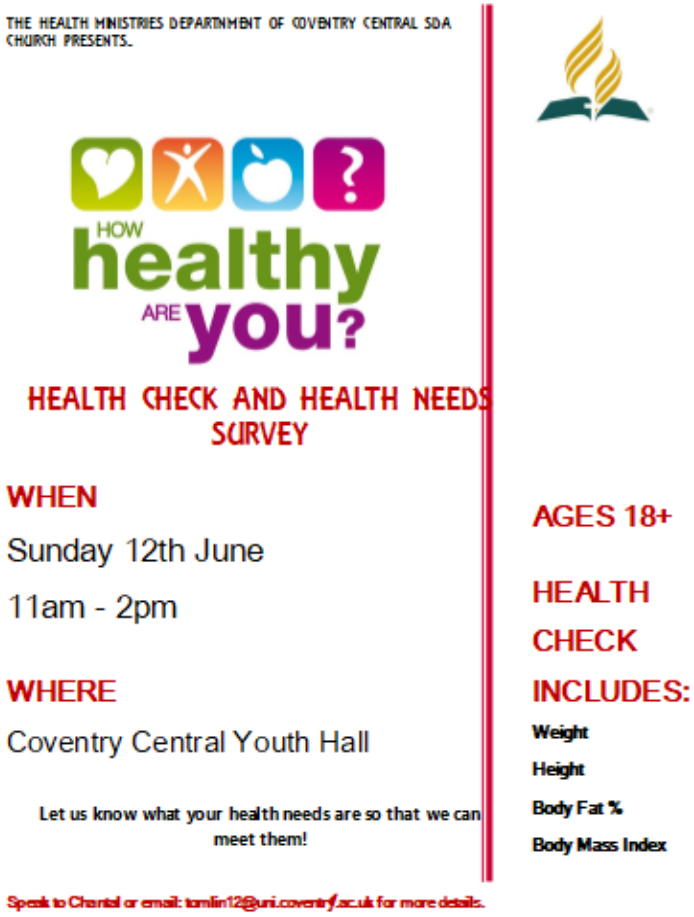
Yours Sincerely

Gibson Marimanzi

Church Clerk

Pastor Lloyd Lambert 07855 989140. email: lloydlambert1@hotmail.com

Appendix 4- Advertising Poster



Appendix 5- Participant Information Sheet

Participant Information Sheet

Study title:

A cross-sectional survey of health needs, healthcare access and health behaviours of individuals within a Seventh-day Adventist Church in Coventry.

What is the purpose of the study?

The aim of this study is to assess and evaluate the health needs and health behaviours within the Seventh-day Adventist church in order to provide healthcare services to meet the needs of individuals within this population group.

Why have I been approached?

For the purposes of the study I need to recruit adults (18+ years) who identify themselves as being Seventh-day Adventist and attend the church in Coventry. These are the only criteria that I have for recruiting people to the study.

Do I have to take part?

No. Participation is entirely voluntary. If you change your mind about taking part in the study you can withdraw at any point during the sessions and at any time in the two weeks following that session. You can withdraw by contacting me on email and providing me with your participant information number. If you decide to withdraw all your data will be destroyed and will not be used in the study. There are no consequences to deciding that you no longer wish to participate in the study.

What will happen to me if I take part?

You will be asked to fill out a survey answering questions regarding your current health status and areas of health that you would be interested in learning about or engaging in within the church setting. Your blood pressure, weight, height and body mass index will be measured.

What are the possible disadvantages and risks of taking part?

Taking part will take up a little of your time, nut the benefit of having your health assessed should outweigh this disadvantage.

What are the possible benefits of taking part?

The purpose of this survey will be to use the results to adequately plan programmes to meet the health needs of the population and enable you to lead healthier lives. This will also enable me to use the information collected to create outlines for programmes that could be conducted in other settings to improve the health of similar population groups.

What if something goes wrong?

It is highly unlikely that anything will go wrong as we are only asking you to complete a questionnaire and have routine measures of weight, height, %body fat, waist circumference and blood pressure take by trained healthcare professionals.

Will my taking part in this study be kept confidential?

Yes. Only myself and my supervisor will have access to the raw data. All the consent forms will be stored in a separate, secure (locked) location from the raw data itself. You will only be identified on the survey by your participant code number. Only the research team will have access to the participant identifiable information. When the data has been entered into a computer file, your scores will only be associated with your code number and access to the file will be password protected. Data has to be kept for a minimum of 3 years post completion.

What will happen to the results of the research study?

The results will be written up and presented as part of my PhD research project and presented at academic conferences and / or written up for publication in peer reviewed academic journals.

Who is organising and funding the research?

The research is organised by Chantal Tomlinson who is in the first year of conducting her PhD at Coventry University. This project is not externally funded.

Who has reviewed the study?

Coventry University Ethics Committee has reviewed and approved this study.

Contact for Further Information

Chantal Tomlinson

tomlin12@uni.coventry.ac.uk

Appendix 6- Informed Consent Form

Participant Consent Form

Participant Reference Code: _____

I have read and I understand the participant information sheet for this study. ☐

By handing this questionnaire back to you, completed, I am giving my consent for you to use my questionnaire answers in this research study. ☐

By signing this consent form I give consent for my weight, height, % body fat and blood pressure to be measured. ☐

I understand that I have the right to withdraw my questionnaire at any point, by contacting the researcher using the details on the participant information sheet and quoting the participant reference code written at the top of this questionnaire. ☐

I have made a note of my participant reference code ☐

Signed: _____

Print Name: _____

Witnessed by: _____

Print Name: _____

Researcher's Signature: _____

Appendix 7- Health Needs Survey Pre-Pilot

Coventry Central Seventh-day Adventist Church

Health Survey

This survey is anonymous and is to be completed only by persons 18 years of age and older. Your responses will help the health ministries team plan and offer programmes for your health and abundant life in Christ. All results will be kept anonymous and confidential and only general and summary results will be shared with the congregation. Thank you for your help with this survey.

1. **How do you rate you overall health?**

- Excellent
- Good
- Fair
- Poor

2. **Please list any health conditions that you may have.**

3. **Do you currently take any medication? If so, please state.**

4. **Are you willing to make some changes that will lead to a healthier lifestyle?**

- Yes
- No

Health Practices

5. **Do you smoke or use any type of tobacco?**
   - Yes

- No

6. **Do you drink any type of alcoholic beverage?**
   - Yes
   - No

7. If yes, over the past 7 days, on how many days did you drink alcohol?

8. **If you drank alcohol what type of drink have you had over the past 7 days?**

	Please tick which applies to you (√)	**What size were these drinks? e.g. pint, large or small, single or double**	**How many of these drinks did you have?**
Beer or Cider			
Wine			
Fortified wine e.g. port or sherry			
Spirits or liqueurs			
Other, please specify _____			

9. **Were your drinking habits over the past 7 days typical?**

Yes (please tick) ☐

No, I normally drink more _____ (please specify drink type)

No, I normally drink less_____ (please specify drink type)

10. **How many hours of sleep do you get on average?**
    - Over 9 hours
    - 7-9 hours
    - Less than 7 hours

11. **Do you follow any special diet?**
    - Yes
    - No

12. If yes, please check the diet you follow:

- Diabetic
- Reduced calorie
- Vegetarian
- Vegan
- Low fat/low cholesterol
- More fruits/vegetables
- Other _____

13. Please 'X' the number of portions of foods eaten for every row.

	0	**1**	**2**	**3**	**4+**
Breakfast Cereal					
Fruit for breakfast e.g. on cereal					
Crisps					
Fruit as a between meal snack					
A glass of pure, unsweetened fruit juice (not squashes or fruit drink)					
Fruit as a starter to a meal					
A bowlful of home-made style vegetable soup					
Portions of vegetables with main meals (include baked beans and pulses as vegetables but not potatoes)					
Any type of meat					
A bowlful of A vegetable based meal					
Any type of fish					
A bowlful of salad					
Fruit as dessert					

14. Please tell us the type and amount of physical activity involved in your work.

		Please mark one box only
A	I am not in employment (e.g. retired, retired for health reasons, unemployed, full-time carer etc.)	
B	I spend most of my time at work sitting (such as in an office)	
C	I spend most of my time at work standing or walking. However, my work does not require much intense physical effort (e.g. shop assistant, hairdresser, security guard, childminder, etc.)	
D	My work involves definite physical effort including handling of heavy objects and use of tools (e.g. plumber, electrician, carpenter, cleaner, hospital nurse, gardener, postal delivery workers etc.)	
E	My work involves vigorous physical activity including handling of very heavy objects (e.g. scaffolder, construction worker, refuse collector, etc.)	

15. During the last week, how many hours did you spend on each of the following activities?

Please mark one box only on each row

		None	**Some but less than 1 hour**	**1 hour but less than 3 hours**	**3 hours or more**
a	Physical exercise such as swimming, jogging, aerobics, football, tennis, gym workout etc.				
b	Cycling, including cycling to work and during leisure time				
c	Walking, including walking to work, shopping, for pleasure etc.				
d	Housework/Childcare				
e	Gardening/DIY				

16. How many hours would you spend sitting on an average day (i.e. watching TV, surfing the web, at a desk)?

- 1-2 hours
- 3-5 hours
- 6-8 hours
- Over 8 hours

Health Interests

17. Please place an A (attending) or H (helping) or both for programmes listed below that you would be interested in attending and/or helping with.

Attending (A) or Helping (H)	Programme
	Addictive behaviours (e.g. smoking, alcohol/drugs)
	Chronic disease (e.g. type 2 diabetes, hypertension, heart disease)
	Infectious diseases (e.g. HIV, flu)
	Mental health (e.g. anxiety, depression)
	Stress Management
	Nutrition (e.g. healthy eating/healthy cooking/food safety)
	Smoking Cessation
	Women's health issues
	Fitness
	Weight loss
	Cancer Prevention
	Coping with grief/loss
	Men's Health Issues
	Sexual Health Issues
	Other

18. Please list 5 programmes from the above that you will most likely attend in order of preference with 1 being the programme you are most likely to attend:

1.
2.
3.
4.
5.

19. **How would you like to receive health education and information? Select all that apply.**
    - Seminar
    - Health Fair
    - Pamphlet/brochure
    - Include in church bulletin
    - Email health news and events
    - Other

20. **Please select the days and evening times you are available to participate in a health ministry activity.**
    - Monday
    - Tuesday
    - Wednesday
    - Thursday
    - Friday
    - Saturday*
    - Sunday*

    - 4pm – 6pm
    - 6pm – 8pm

*Other times may be written for Saturday and Sunday

21. **If you have, or know someone with, expertise in any of the above areas and would be able to conduct a presentation, please list contact information.**

Name **Expertise** **Number** **Email**

Demographics and Other

22. How old are you?

23. Gender
- Male
- Female

24. Ethnicity
- Black
- White
- Asian
- Other (please specify)

25. Education
- Did not complete high school
- Completed high school
- Attended College
- Currently at university
- Completed undergraduate degree
- Completed post-graduate degree

26. Do you have any children under the age of 18?
- Yes
- No

27. If yes, what are their ages?

28. Would you approve of them participating in age-appropriate health programmes?
- Yes
- No

29. Please identify the types of health programmes that would be of interest to your children:

30. **What area do you live in?**

31. **Are you a member of this church?**
    - Yes
    - No

32. **Do you believe that trust in God which results from being a Christian tends to promote all-around better health?**
    - Yes
    - No

33. **Please rank in order of preference where/who you seek help from when there is a problem with your health (with 1 being the first person, and 6 being the last):**

God (through prayer and/or fasting)	
The Health Services (GP, Walk-in centre, hospital)	
Church Leaders	
Books/internet	
Friends	
Other (please specify)	

Anthropometric Measures

34. Please fill note down the following values as you proceed through the health check:

Anthropometric Measure	Value
Weight (kg)	
Body Fat %	
Height (cm)	
Body Mass Index (BMI)	
Waist Circumference (inches)	
Blood Pressure (mm/Hg)	

Thank you for taking the time to complete this survey!

Appendix 8- Health Needs Survey Post-Pilot

Coventry Central Seventh-day Adventist Church

Health Survey

This survey is anonymous and is to be completed only by persons 18 years of age and older. Your responses will help the health ministries team plan and offer programmes for your health and abundant life in Christ. All results will be kept anonymous and confidential and only general and summary results will be shared with the congregation. Thank you for your help with this survey.

1. **How do you rate you overall health?**

- Excellent
- Good
- Fair
- Poor

2. **Please list any health conditions that you may have.**

3. **Do you currently take any medication? If so, please state.**

4. **Are you willing to make some changes that will lead to a healthier lifestyle?**

- Yes
- No

Health Practices

5. **Do you smoke or use any type of tobacco?**
   - Yes
     - How long have you been doing this _____years
     - How many cigarettes do you smoke a day? _____
   - No, but I stopped _____year ago
   - No, never

6. **Do you drink any type of alcoholic beverage?**
   - Yes
   - No

7. **If yes, over the past 7 days, on how many days did you drink alcohol?**

8. **If you drank alcohol what type of drink have you had over the past 7 days?**

	Please tick which applies to you (√)	**What size were these drinks? e.g. pint, large or small, single or double**	**How many of these drinks did you have?**
Beer or Cider			
Wine			
Fortified wine e.g. port or sherry			
Spirits or liqueurs			
Other, please specify _____			

9. **Were your drinking habits over the past 7 days typical?**

Yes (please tick) ☐
No, I normally drink more _____ (please specify drink type)

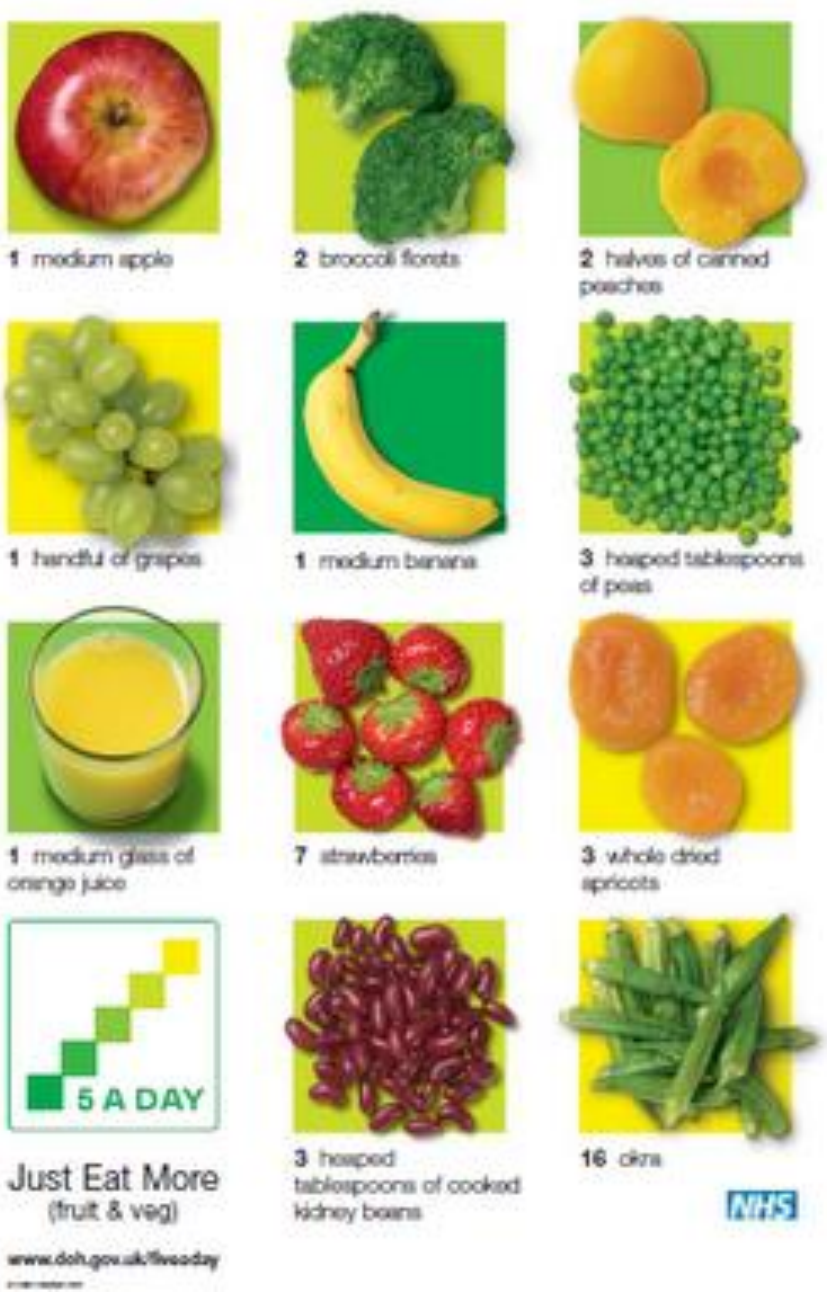
No, I normally drink less_____ (please specify drink type)

10. **How many hours of sleep do you get on average?**
    - Over 9 hours
    - 7-9 hours
    - Less than 7 hours

11. **Do you follow any special diet?**
    - Yes
    - No

12. **If yes, please check the diet you follow:**
    - Diabetic
    - Reduced calorie
    - Vegetarian
    - Vegan
    - Low fat/low cholesterol
    - More fruits/vegetables
    - Other _____

13. **Please ‘X’ the number of portions of foods eaten in each row over the past 24 hours.** One portion is 80g, or one handful please refer to the chart below for examples.



	0	1	2	3	4+
Breakfast Cereal					
Fruit for breakfast e.g. on cereal					
Crisps					
Fruit as a between meal snack					
A glass of pure, unsweetened fruit juice (not squashes or fruit drink)					
Fruit as a starter to a meal					
A bowlful of home-made style vegetable soup					
Portions of vegetables with main meals (include baked beans and pulses as vegetables but not potatoes)					
Any type of meat					
A bowlful of A vegetable based meal					
Any type of fish					
A bowlful of salad					
Fruit as dessert					

14. Please tell us the type and amount of physical activity involved in your work.

		Please mark one box only
a	I am not in employment (e.g. retired, retired for health reasons, unemployed, full-time carer etc.)	
b	I spend most of my time at work sitting (such as in an office)	
c	I spend most of my time at work standing or walking. However, my work does not require much intense physical effort (e.g. shop assistant, hairdresser, security guard, childminder, etc.)	
d	My work involves definite physical effort including handling of heavy objects and use of tools (e.g. plumber, electrician, carpenter, cleaner, hospital nurse, gardener, postal delivery workers etc.)	
e	My work involves vigorous physical activity including handling of very heavy objects (e.g. scaffolder, construction worker, refuse collector, etc.)	

15. **During the last week, how many hours did you spend on each of the following activities?**

Please mark one box only on each row

		None	Some but less than 1 hour	1 hour but less than 3 hours	3 hours or more
a	Physical exercise such as swimming, jogging, aerobics, football, tennis, gym workout etc.				
b	Cycling, including cycling to work and during leisure time				
c	Walking, including walking to work, shopping, for pleasure etc.				
d	Housework/Childcare				
e	Gardening/DIY				

16. How many hours do you spend sitting on an average day?

- 1-2 hours
- 3-5 hours
- 6-8 hours
- Over 8 hours

Health Interests

17. Please place an A (attending) or H (helping) or both for programmes listed below that you would be interested in attending and/or helping with.

Attending (A) or Helping (H)	Programme
	Addictive behaviours (e.g. smoking, alcohol/drugs)
	Chronic disease (e.g. type 2 diabetes, hypertension, heart disease)
	Infectious diseases (e.g. HIV, flu)
	Mental health (e.g. anxiety, depression)
	Stress Management
	Nutrition (e.g. healthy eating/healthy cooking/food safety)
	Smoking Cessation
	Women's health issues
	Fitness
	Weight loss
	Cancer Prevention
	Coping with grief/loss
	Men's Health Issues
	Sexual Health Issues
	Other

18. Please list 5 programmes from the above that you will most likely attend in order of preference with 1 being the programme you are most likely to attend:

6.
7.
8.
9.
10.

19. How would you like to receive health education and information? Select all that apply.

- As usual from the NHS
- Seminar
- Health Fair
- Pamphlet/brochure
- Include in church bulletin
- Email health news and events
- Other

20. **Please select the days and evening times you are available to participate in a health ministry activity.**

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday*
- Sunday*

- 4pm – 6pm
- 6pm – 8pm

*Other times may be written for Saturday and Sunday

21. **If you have, or know someone with, expertise in any of the above areas and would be able to conduct a presentation, please list contact information.**

Name

Expertise

Number

Email

Demographics and Other

22. How old are you?

23. Gender

- Male
- Female

24. Ethnicity

- Black
- White
- Asian
- Other (please specify)

25. Education

- Did not complete high school
- Completed high school
- Attended College
- Currently at university
- Completed undergraduate degree
- Completed post-graduate degree

26. Do you have any children under the age of 18?

- Yes
- No

27. If yes, what are their ages?

28. Would you approve of them participating in age-appropriate health programmes?

- Yes
- No

29. **Please identify the types of health programmes that would be of interest to your children:**

30. **What area do you live in?**

31. **Are you a member of this church?**

- Yes
- No

32. **Do you believe that trust in God which results from being a Christian tends to promote all-around better health?**

- Yes
- No

33. **Please rank in order of preference where/who you seek help from when there is a problem with your health (with 1 being the first person, and 6 being the last):**

God (through prayer and/or fasting)	
The Health Services (GP, Walk-in centre, hospital)	
Church Leaders	
Books/internet	
Friends	
Other (please specify)	

Anthropometric Measures

34. Please fill note down the following values as you proceed through the health check:

Anthropometric Measure	Value
Weight (kg)	
Body Fat %	
Height (cm)	
Body Mass Index (BMI)	
Waist Circumference (inches)	
Blood Pressure (mm/Hg)	

Thank you for taking the time to complete this survey!

Standard operating procedure for measuring blood pressure using a digital machine.

This procedure is based on using the BpTRU BPM 100 digital machine, please refer to the manufacturer's instructions of your own specific model where necessary. Ensure that the blood pressure machine's calibration/validity check is within date.

- Let patient sit for at least 5 minutes, give them an explanation of the number of readings to be performed and explain that they will feel a tight squeeze on their arm during the procedure.
- Ascertain before starting if patient has any history of mastectomy, partial mastectomy, lumpectomy or any procedure which may have resulted in removal of regional lymph nodes. The arm on the side this occurred should not be used. Doing so will put the participant at risk of lymphoedema.
- Patient should be seated with right arm supported and horizontal at mid-sternum (heart level). Ask patient to relax arm, not to fidget or talk.
- Tight or restrictive clothing around the arm should be removed.
- Confirm by looking at cuff markings for suitable size for the upper arm. *

Indication	BHS Guidelines Bladder width & length (cms)	Arm circ. (cm)
Standard Adult	12x26	<33
Large Adult	12x40	<50

- Feel for the brachial artery on the anterior aspect of the elbow and ensure the indicator mark on the cuff is positioned over this.
- Ensure cuff is tight but allow two fingers to be inserted between cuff and arm. The bladder should encircle at least 80% of the arm (but not more than 100%).
- Press Clear to clear memory between patients
- Press Cycle button to SP (manual mode)
- Press start
- Take blood pressure and record measurement as displayed. Keep the cuff round the arm and repeat blood pressure after a few minutes and record the value.
- If measurements are very different, take a third reading and record.
- If error messages occur check list below and re-adjust cuff if necessary before continuing.
- If errors persist or BP is outside the normal range only continue for a **maximum of 3** readings per patient and record all error messages/BP readings.

Press Stop to pause measurements
Press Review to look at past readings
To stop inflation or cause rapid deflation pull cuff tubing out of machine.

For clinical interpretation, please see the table.

Actions to take on BP measurement If BP on second reading is greater than 140 systolic or 100 diastolic recommend that the participant sees their GP. If BP >180 systolic or 110 diastolic recommend they see their GP as a matter of urgency.

If patient is on anti-hypertensives and you are worried that BP is too low

1. With BP, the lower it is, the lower the risk of stroke and MI.
2. If the BP is well below target (<140/85), say 10 or 20mm below, and the person is having symptoms of fainting or postural hypertension, ask them to make an appointment with their GP directly.

Normal BP Ranges

*Category		Systolic BP (mmHg)	Diastolic BP (mmHg)
Optimal BP		<120	<80
Normal BP		100 -130	60 - 85
High Normal BP		130-139	85-89
Grade 1	Hypertension (mild)	140-159	90-99
Grade 1	Subgroup: Borderline	140-149	90-94
Grade 2 Hypertension (moderate)		160-179	100-109
Grade 3 Hypertension (severe)		≥180	≥110
Isolated Systolic Hypertension		≥140	<90
140-149	<90		

Error codes

Code	Description	Corrective Action **
---	User-cancelled	None required
E0	Too few pulses detected	Tighten cuff or check for leaks
E1	Motion artifact	Reduce motion of patient
E2	Cuff overpressure	Reduce motion, ensure cuff is applied properly and tubing is not kinked.
E3-6	Inflation/deflation error	Check for kinks or leaks

E7	Pressure offset Calibration not complete	Wait 5 seconds and repeat
E8	Low pulse amplitude	Tighten cuff or check for leaks
E9	Vacuum detected	Push clear button. Disconnect cuff and wait 15 seconds before reconnecting. Perform zero-offset check.
E10	Cuff over 300 mmHg for more than 5 seconds	Reduce motion, check cuff and tubing for kinks
E11	Cuff pressurized for more than 130 seconds	Check for cracks, tears, tightness and kinks
E12	Automatic cycling timing violation	Check cuff and tubing for kinks
E13	Device reset	Readings in memory, if any, are available for review. Check for electro-magnetic interference (ESD, power interruptions). Connect USB cable between measurements or when device is powered off.
E14	Data corrupted after reset	Power off, wait 5 seconds, and power on again
E20	Indeterminate systolic b.p.	Tighten cuff on arm and check for normal inflation pressures
E21	Indeterminate or low diastolic	Tighten cuff on arm and check for leaks
E22	Indeterminate pulse rate	Tighten chuff on arm and check for leaks
E23-26	Out of range error	Check BP and HR manually

*Derived from recommendations from the British Hypertension Society (BHS) guidelines
** Derived from BpTRU Operator's Manual

Appendix 10 - Standard operating procedure for height measurement

This is based on using the Leicester Height Measure, but in principle will also apply to other height measuring equipment. If you are using a height measure that needs assembling, follow manufacturer's instructions for assembly and check pieces are in the correct order and pushed fully into place.

- Place height measure against a wall ensuring it is vertical
- Shoes and socks/tights to be taken off.
- Place heels, buttocks and shoulders to upright of Leicester Height Measure.
- Weight should be evenly distributed on both feet
- Move indicator touching top of head, but not pressing down.
- Make sure head is on a level looking forward (not tilted up or down).
- Hold head up under patient's ears and ask them to breathe in – the level should move up.
- Reading is made to the nearest 0.1cm.
- Record reading on form
- Wipe down surface participant stands on and the indicator between participants with alcohol wipes.
- If patient has posture problem, eg bow legs, arthritis, kyphosis make note in comments column.

Appendix 11- Standard operating procedure for Tanita Scales (Measuring Weight & Body fat composition)

WARNING: This equipment sends a weak electrical current through the body during measurement. Individuals who have internally implanted medical devices, such as Pacemakers, should not use this equipment due to the risk of malfunction to the device that may be caused by the weak electrical current.

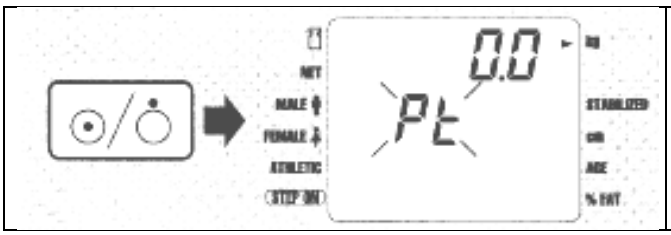
Measurement must be taken in bare feet, for hygiene purposes the scale must be wiped using an alcohol wipe before and after use.

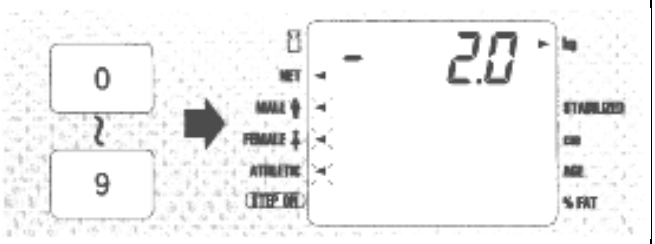
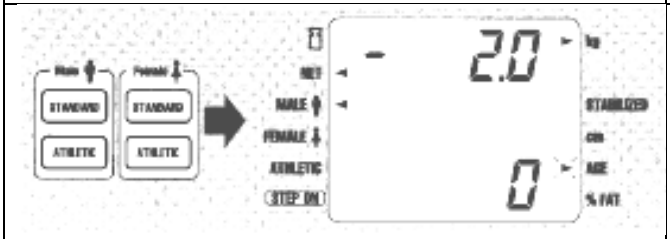
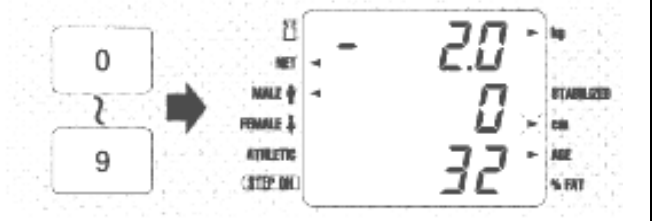
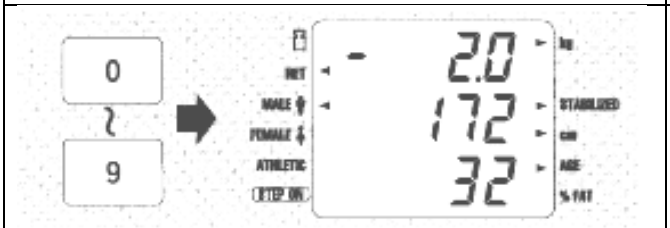
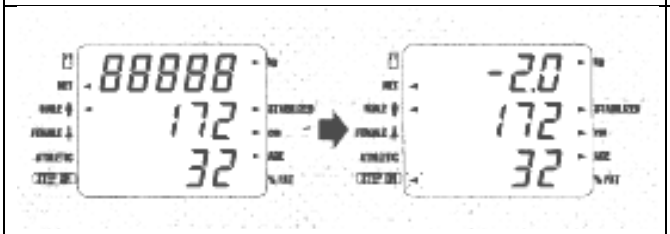
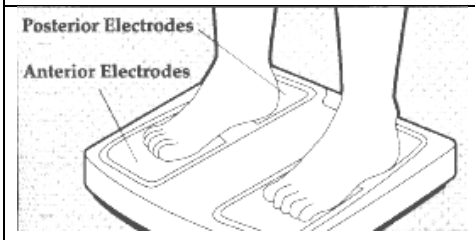
All people must be weighed without outdoor jacket or coats and should remove heavy items from pockets e.g. keys, purse, coins.

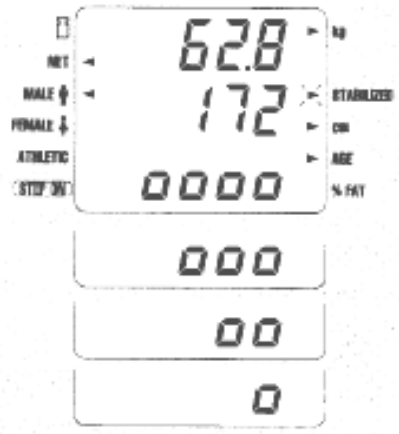
For best results the following should be observed, but this won't always be practical in every situation. Please note whether these have been followed and if a participant is on diuretics:

- Patients should have taken no alcohol 48 hours before the test
- Patients should avoid intense exercise 12 hours before the test
- Patients should avoid eating or drinking (especially caffeinated products) 4 hours before the test
- Patients should empty the bladder 30 minutes before test
- Test should be taken 3 hours after waking
- Illness at the time of measurement may affect individual hydration levels, which may affect results.

Operating Instructions for Tanita Scales

	Place the weighing platform on as flat a surface as possible and adjust the level with the adjustable feet so that the bubble in the level gauge is in the centre of the frame.
	Do not take measurements while using transmitters, such as mobile phones, which may affect readings.
	**1. Turn on the Power** Press the [⊙/Ō] key. "O.O" will appear on the upper portion of the display.

	**2. Enter Clothes Weight** Enter clothes weight as 0.5 kg for everyone by using the numerical keys pressing [0], [.] and then [5]. When the data input is completed, the data will be displayed as a minus number. *Clothes weight can be displayed by pressing the PT key.
	**3.Select the Body Type** Select from **Standard Male** or **Standard Female** only.
	**4.Enter Age** If the user is 32 years old, press [3] and [2].
	**5. Enter Height** If the user's height is 172 cm, press [1], [7] and then [2].
	**7. After "88888" is displayed on the upper portion of the screen, a flashing arrow will appear next to Step On.**
	**8. Start Measurement** Step on the weighing platform with bare feet so they touch the electrodes. Stand in a stable position without bending knees.

	**9. Measure Your Weight** An arrow will flash next to [STABILIZED] and the weight will be displayed on the upper portion of the screen. **10. Measure the Impedance** After the weight measurement stabilizes, "oooo" is displayed on the lower portion of the screen and an impedance measurement is taken. As the measurement is being taken, the "oooo" symbols disappear one by one. Do not step off the Weighing Platform until the "oooo" symbols disappear completely.
	**11. Measurement is Completed** When the measurement of body weight and impedance is finished, the body fat ratio is displayed on the lower portion of the screen and a short beep is emitted. The measurement result is also automatically printed out.
	**12. When you continue to measure** After printing is completed, go back to step 3. Measure by entering the data in the same procedure. **13. Enter details from print-out into CRF.**

Troubleshooting Error Messages:

E:01	Abnormal impedance compared to height and weight, e.g. problem with electrode contact, feet dirty, calluses, poor contact. Action: use a drop of water on pads. OR body fat ratio exceeds the measuring capacity – stop measuring
E-11	Measurement impossible because of excessive vibration or electrical noise
E-12, 13 or 14	Machine requires adjustment
E-16	Impedance measurement unstable. Action: improve conductivity by cleaning feet, placing water on electrodes.
No print out:	Action: Ensure number of printouts selected is greater than 0, correct brand of paper is used, paper roll is in correct position, no paper jam present
Paper does not come out	Check that paper is not jammed
P-End displayed	Action: put in new roll, check paper advances properly, ensure paper release lever is not in the "Up" position

Uuuu displayed	Power has been turned off during measurement. Action: Do not place anything on, or stand on scales, before starting measurement.
---- is displayed	Maximum weight capacity has been exceeded
Feed key not functioning	Possibly the number of print outs selected is 0, select a number greater than 0. Possibly the weight scale mode is selected, select the Body Fat Measurement Mode instead.

Appendix 12- Guidance for taking waist measurements (British Heart Foundation n.d.)

Session 13 sheet

Waist measurement instructions

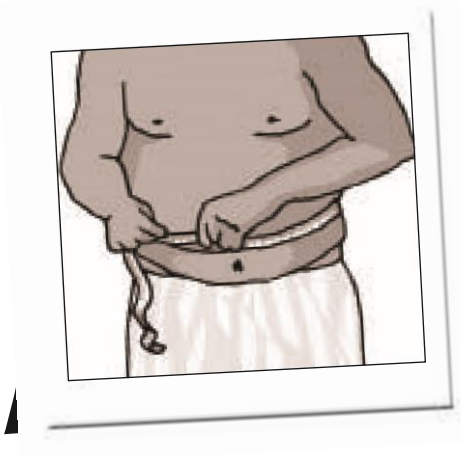
Your body shape

People who carry too much weight around their middle have a greater risk of developing coronary heart disease, high blood pressure and diabetes. One way of finding out if your body shape is increasing your risk of coronary heart disease is by measuring your waist.
The guidelines on ethnic differences in waist size/health are complex and at present we only have robust data for people of European and Asian backgrounds. At present, robust data for other ethnic groups is not available and so current recommendations state that if you are not of Asian background you should follow the guidelines for European men and women[1].

People of Asian backgrounds have separate recommendations because they are more likely to have a higher proportion of body fat to muscle than the rest of the UK population. They also tend to carry this fat around their middle. This means that they have a greater risk of developing problems such as diabetes and coronary heart disease at a lower waist size than other people in the UK. This is also why one side of the tape measure is specifically for Asians.
However, no matter what your ethnic background it is important to remember that these measurements are just a guide. If you are unsure about how your ethnic background relates to the guidelines, please talk to your doctor who will be able to make a more individual assessment of your overall health and risk factors.

How to measure your waist in 3 easy steps:

3. Check that you are using the right side of your tape measure for your ethnic origin.
4. Find the point halfway between the bottom of your ribs and top of your hips. This will probably be at the level of your tummy button or slightly higher. Measure yourself around the middle point.
   Remember to start from the lowest end of your tape measure and try to relax and avoid breathing in!
5. Check your measurement with the chart below, or use the colour guide on the tape measure to see if it falls within the white (low risk), pink (increasing risk) or red (high risk) section. Men should follow the metric side (cm) and women, the imperial side (inches).



1. 30* International Diabetes Federation. 2005. The IDF Consensus Worldwide Definition of the Metabolic Syndrome. Brussels, Belgium: International Diabetes Federation.